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TRUCK?

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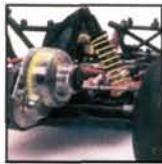
BY CHRIS CHIANELLI

ON THE COVER (from top): the fastest
stock motor ever—Trinity P2K; Kyosho
returns to racing with the Ultima ST gas
truck; Team Losi's new Triple-XT electric
truck revealed (photos by Walter Sidas).

Hot Trucks!

Those two words do a good job of summing up this month's issue of *Radio Control Car Action*. In addition to the most detailed homebuilt monster truck ever to grace the pages of this mag, you will also find exclusive "First Looks" at the most eagerly anticipated race trucks of the year.

The **Homebuilt Extreme Overkill** appears courtesy of master modeler Dave Pack, who definitely knows a thing or two about real monster truck technology (he'd better, since he wrenches on the full-size Extreme machine for driver/owner Kirk Dabney). In addition to the usual "making of" photos and commentary, Kevin Hetmanski (our newest editor) has added an interview with Kirk and some insider info on what it's really like to get behind the wheel of a crusher.



If you prefer trucks designed to crush the competition rather than crushing cars, we have you covered. Senior West Coast editor George M. Gonzalez took a trip out to the Losi skunk works for an inside look at the **Team Losi Triple-XT**, which brings Triple-X buggy tech to the truck world. Naturally, there's more to this machine than a set of truck tires, and George reveals all.

While the appearance of the new Triple-XT is sure to keep the old Associated-versus-Losi battle blazing, both companies had better keep an eye on their rearview mirrors, since Kyosho is coming on strong with a pair of all-new race trucks.

Our exclusive look at the gas and electric **Kyosho Ultima ST** trucks shows the new K-cars to be thoughtfully engineered for maximum performance and pure functionality. It's going to be a great year for truck racing!

To cop a line from Ronco, "Wait; there's still more." The new **Trinity P2K** stock motor gets the nowhere-to-hide dyno treatment from motor master Steve Pond; $\frac{1}{8}$ scale goes ready-to-run with a complete test of the DuraTrax Axis; the top-of-the-line Schumacher Fireblade EVO and Kyosho TF-4 Type R are wrung out as well.

This issue is packed!

We enjoyed putting it together; I sincerely hope you enjoy devouring it. See you next month!

Peter Vieira

Executive Editor

peter@airage.com



RADIO CONTROL car action

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Flashback

The December '99 issue was killer! The project car and history of RC articles are great. Could you guys include more action shots of the cars tearing it up in the "Track Test" and "Project" articles? The "Time Warp" stories you used to do were great; are they coming back? It would be neat to see something on the Tamiya Super Champ, Fox, or Bruiser.

ANTHONY CHURCH
Charlotte, NC



Everybody loves the old stuff! We'll definitely be doing more "Time Warp" articles, and the Tamiya cars you mentioned are high on the list of possibilities. Anybody out there sitting on a hot car from yesteryear? We'd love to see it.

—Pete

Rustler Racer

I've been reading *Car Action* for three years now. The first truck I had to have was a Traxxas Rustler, and it was the best decision I could have made. I took a stock Rustler and added only bearings, Associated shocks, a speed control and a stock motor and started racing on a clay oval on Saturdays. Let me tell you guys, Rustlers own ovals! I don't know if it's the gear diff or what, but it really hauls. Week after week, my truck is competitive with all the Losi Double-X and Associated T3 trucks. This just goes to show ya how competitive a Rustler can be with a few parts and a halfway decent driver.

Keep up the insane projects guys, I love 'em!

BILL S.
Camillus, NY

Who says you're a halfway decent driver? Just kidding. Bill, I'm with you. It takes some pretty bad equipment to keep a good driver down. However, I'm not surprised your Rustler can hang;

people tend to underestimate that little truck.

—Pete

Yes to Bearings

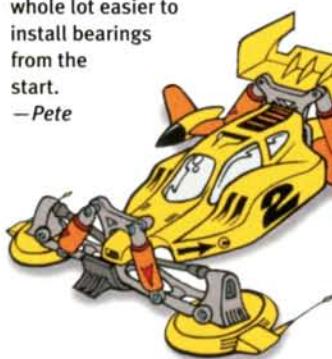
I am interested in getting into RC touring cars, and I'm currently looking at the HPI RS4 Sport. I am only 14, and budget price is what I'm looking for! I'm not really interested in anything more than occasional racing; are ball bearings really necessary for the driving I'll be doing?

JONATHAN KRIZ
Roselle, IL

The RS4 Sport is a great car; you'll definitely have fun with it. I realize you're looking to save dough, but I strongly encourage you to

get a set of bearings. You don't have to get the best; an inexpensive set from DuraTrax or bulk bearings are fine. The kit's bushings won't hold you back, but they must be well lubed to work efficiently, and that lube attracts a lot of dirt and grit, and that accelerates wear. Before too long, the bushings will get sloppy (in both the "not clean" and "too much play" senses), and you'll have to tear down the car to replace them. It's just a whole lot easier to install bearings from the start.

—Pete

**Already Invented?**

Hey, Pete; I liked your "repulsor-lift" car idea ("Future RC," January 2000), but I hate to tell you: it has already been invented. They used "skate" boards with that technology in "Back To The Future II." Mattel was going to sell them but worried about lawsuits from peo-

ple getting hurt, so they never came out. It's true. [email]
JAMES FLYNT

Uh, you've been had, my friend. Thanks to my amazing knowledge of science-fiction fandom, I can tell you that director Robert Zemeckis tossed off that bogus story in a "making of" segment on "Back To The Future II." They flew Michael J. Fox on wires, did some bluescreen work and used other practical gags to create the levitating-board illusion. Here's a movie story with an RC connection that is true: in "Kiss of the Vampire," Nicholas Cage pulls a J.D. Beckwith and eats a live cockroach on screen. For real! If you don't know who J.D. is, just post "What does J.D. Beckwith have to do with bug eating" in any RC chat room on the Net.

—Pete

More Tour

Steve from Australia here. I just finished reading your December issue and was interested in the "Project Gallery" article. However, I was left in anticipation as you neglected to include a "super modified" 4WD electric touring car. Can you possibly include one in a future issue? A super-mod HPI RS4 Pro2 or the Associated TC3 would be great. [email]
STEVE

Darwin, Australia

Steve, you will definitely see a mega-mod electric tourer (or two) in our next "Project Gallery."

Anybody else have a request? Write or email your ideas, and we'll be sure to give you credit if your idea inspires us.

—Pete

**No, Really—
It's a Clod**

I am thinking about buying a Tamiya Clod Buster. It looks really cool, but I don't understand one thing. Whenever I see the finished clods in "Readers' Rides" and show them to guys at the shop, they say that the trucks look like that because of hop-ups. So I looked up a stock Clod in an old issue, and what I found looked nothing like the one in the

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," *Air Age Inc., Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

EMAIL ADDRESSES:

Chris Chianelli: chris@airage.com
George Gonzalez: george@airage.com
Kevin Hetmanski: kevin@airage.com
Steve Pond: steve@airage.com
Peter Vieira: peter@airage.com
Greg Vogel: greg@airage.com

December issue on the cover and on pages 32 and 98. The body and chassis are all plastic and stuff. Not even the tires looked the same! Can you tell me if, indeed, it is the same kit. [email]
WILLIAM J. WELLS

The guys at the shop are right. Those killer Clods you like so much get their eye-appeal from an aftermarket chassis kit and a set of aluminum oil shocks. You can add a lot more to your Clod, but those are the two essentials for a trick look. Check out Kevin Hetmanski's "Mod Clod Shootout" in the May '98 issue for a head-to-head comparison of the ESP and Bennett Clod chassis kits, and be sure to look up Kevin's new "4x4" column each month right here in *Radio Control Car Action*.

—Pete

Your Choice

Hi; I will make this simple. Which is better: the DuraTrax Maximum ST or the Associated RC10GT ready to run? [email]
JEREMY

Yeah, thanks for making it "simple." Jeremy, how the heck do I know which is better for you? I like to race, so I would buy the GT. If I planned to jump my truck at the BMX track all day and tear around in the woods, I would probably get the Max. I suggest you ask your local dealer for help, and keep an open mind; it could turn out that a Traxxas or Kyosho truck will actually be best for you. I don't know what you plan to do with your truck, but I encourage you to have fun doing it!

—Pete ■



BY CHRIS CHIANELLI

The latest from O.S.



O.S. now offers both the .12 and .15CV Hyper engines in pull-start versions. They have all the Hyper's high-performance features with the added convenience of a pull-start. These engines will carry the "CVX" suffix.

Also shown is O.S.'s 4-stroke .26 "torque-machine"; this, too, has been given the pull-start treatment.

Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



The 1/10 commandment

The SuperTen FW-04 is the fourth generation of GP racer from Kyosho. This chassis features a full-time, shaft-drive 4WD system. The holes in the main chassis are countersunk to reduce surface contact, and both decks are made of very strong aircraft-grade aluminum. The new onboard receiver box is dustproof and easily accessible, and the longer suspension arms and drive shafts help to improve stability and handling. There are three easy-to-change front-caster adjustment options (7.5, 11 and 14.5 degrees), and the rear, multi-link suspension system also allows a multitude of camber- and toe-angle adjustments. Many parts have been further strengthened, and all of the mechanical components are positioned to give the lowest possible center of gravity. Kyosho's newly designed GS15R pull-start engine provides the power, and it's supplied with fuel from an easy-to-fill 100cc flip-top fuel tank. The previous version of the SuperTen was the hands-down winner of *RC Car Action's* "Super Nitro Shootout," and by the looks of it, the FW-04 is poised to bump it from the top of the hill.



Great Planes Model Distributors/Hobbico, 2904 Research Rd., P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008.

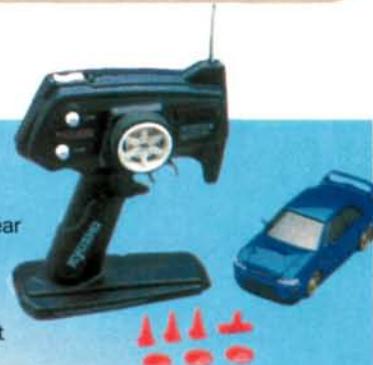


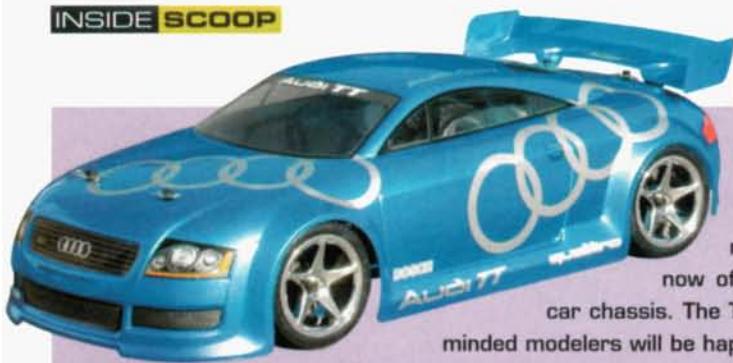
Indoor action

Is there 6 feet of snow outside your window? Is it so cold out there that you just saw a polar bear run across your front lawn wearing earmuffs? No problem! With Kyosho's new 1/30-scale Mini-Z racers, you can have a race in the attic, the basement, or the kitchen using the "Z-scale" turn pylons and dots. These 3.75-inch-long RC racers feature front kingpin-type suspension,

rear pod, gear diff and electronic speed control. There's even an ample list of hop-up parts that

includes such things as rear pod shock, ball diff and hotter motors. At this time, I have no information on when—or even whether—the Z-racers will hit American shores. I sure hope they do; I'll throw the living-room furniture out into that 6-foot snowdrift and have space for a Le Mans-size track! I'll keep you posted if any Z-racer news comes in.



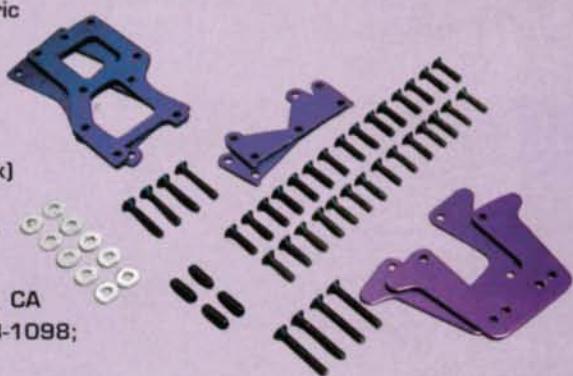


LOTS OF HPI STUFF

When it comes to the Audi TT, you either love it or hate it; there's no in between. If you're in the "love it" ranks, you'll be glad to know that HPI now offers a TT shell for 200mm touring-car chassis. The TT includes an add-on wing, but scale-minded modelers will be happy that the body's rear deck features a smooth design without any wing posts sticking out of the trunk lid. The large decal sheet that comes with each body includes highly detailed headlights, taillights, turn signals, grills, window lines and more! Official Audi "rings" logos are included as well—for an authentic look. To make painting quick and easy, vinyl window masks and an over-spray film are included, too. Also shown are the new roll-center plate kits for the Nitro RS4 and the electric RS4 Pro 2. When a car's ground clearance is set very low, these kits ensure that the best possible suspension-arm angles are maintained; very important for optimum handling.

Last, but definitely not least (in my book) is the pull-start version of the NovaRossi-designed Nitro Star Pro 12R, which also features a rotary carb.

HPI Racing, 15321 Barranca Pky., Irvine, CA 92618; (949) 753-1099; fax (949) 753-1098; www.hpiracing.com.



Switchblade 10SS



Both the EVRO (top) & SBR0 (bottom) front ends are included in the kit!

Foam rear nerf wing!

TRC foam wheels and tires!

ANODIZED YCN micro shocks!



Motor battery
body & electronics
not included.
Car shown
contains some
prototype parts.
Production
parts may vary
in appearance.

Rear suspension has option of using steel "T" bar or mono-ball setup. Rear end may be off set for different truck conditions. Mono ball setup allows putting rear steer into chassis!

Purple flake carbon fiber chassis plates
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to side & from front to back!

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TRINITY



Nostalgic flat-beds

You can always count on Bolink to come up with something no one else has. In this case, it's a '41 Chevy and a '56 Ford pickup. These join Bolink's classic line of $\frac{1}{10}$ -scale bodies.

Also shown is Bolink's new, wider version of the "Stratos." (I guess they couldn't work out the product licensing with Dodge.) Anyway, for those who haven't figured it out, it's a Dodge Stratus—or should I say Dodge Stratus? Or is that a Strudge Datus? Forget it! Just contact:

Bolink R/C Cars Inc.,
420 Hosea Rd., Lawrenceville,
GA 30045;
(770) 963-0252;
fax (770) 963-7334.



APEX SIGMA

The new Apex Sigma peak charger was specifically designed for charging 3000 NiMH (nickel-metal-hydride) batteries. According to its distributor, Magma Intl., with its breakthrough Zero Delta Voltage technology, this charger is capable of charging these cells at 6 to 6.5 amps without drastically reducing battery life by overheating.

Here's how Magma explains Zero Delta Voltage (ODV) technology: some feel that using only 3 amps to charge 3000mAh NiMH battery cells doesn't give the cells all the "punch" they could have. There is, however, the scary thought that increasing the charge current to more than 3 amps could damage your expensive NiMH cells.

Apex claims to have invented the world's first peak charger that uses zero delta voltage technology to detect the delta peak voltage of NiMH cells. While being charged, the voltage of your NiMH batteries will increase to peak voltage before it drops. At peak voltage, Apex ODV technology will be triggered to cut off the charge current to prevent your NiMH cells from being damaged while getting the most out of them. I don't think the charger really detects a "zero" voltage drop to indicate a peak charge, but the Apex unit certainly looks for a much lower drop than a Ni-Cd charger.

Features include: selectable discharge current of 10 and 2 amps; negative delta voltage technology to suit Ni-Cd batteries; adjustable 0.5 to 6.5A charge current; AC/DC (Apex SPS V12 7A switching power supply included); auto-detection of number and type of battery cells (NiMH or Ni-Cd); LCD display showing charge and discharge capacity (volts and amps); built-in, twin-turbo cooling fans; Fuzzy Logic peak detection; reverse-polarity protection; and the pulsed current charges Ni-Cds or NiMH cells to 100 percent without over-charging them.

Magma Intl. (Canada); distributor of Leading Edge R/C Models & Accessories: (905) 305-9753; fax (905) 305-9755.



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Associated Style Spurs
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Fits Cars Which Use
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64 Pitch Gear Sizes

48 P 64 P BK Pitch
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82 Or 110 Use 96 Tooth
84 Or 112 Use 98 Tooth
86 Or 114 Use 100 Tooth

More Efficient Than 48 Pitch
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Spur Gear

New Super Strong
Low Friction, Self
Lubricating Material

Long Wear "Hard Ones"
Style Precision Machined
Steel Pinions With Heavy
Duty 5/40 Set Screws

Pinions-\$4.99, Spurs-\$5.99

GEAR UP FOR 2000 WITH BK PITCH



OFNA Monster Pirate

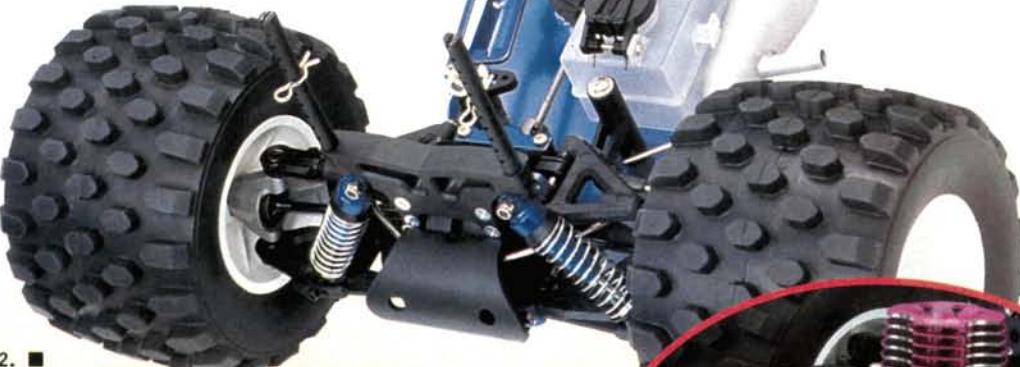
You might have seen the small, body-on photo of this truck in the January '00 issue of *RC Car Action*, but if you're like me and Mr. "4x4" Hetmanski, you want to know—and see—more. Well, here it is. Although it is based on an $\frac{1}{8}$ -scale buggy chassis, there is one major difference: $\frac{1}{8}$ -scale off-road racers have a center diff so you can adjust power transfer between the front and rear gearboxes to tailor handling characteristics. For the Monster, this has been replaced with a solid shaft to match the specific needs of a monster truck whose mission is completely different from an off-road racer's. Power from the new OFNA/Picco .21 is transmitted equally to all four wheels. Wisely, OFNA also lowered the gear ratio from the 4WD buggy's original ratio. This lower ratio compensates for the tires' much larger diameter and should also help in getting this 9.5-pound giant (without radio gear) to accelerate right off the starting line.

And now for the most important things—the tires. At 6.5x4.4 inches on 3.2x3.9-inch rims, they are the biggest yet. OFNA will offer optional, slightly smaller wheels to fit Kyosho tires. Rumor has it that the truck will be available in an 80-percent-built kit and a fully ready-to-run version with high-torque servos for about \$350.

The front universals look tough; with the added heft of the truck's absolutely huge tires, they'll need to be.



OFNA Racing,
22692 Granite
Way, Ste. B,
Laguna Hills, CA
92635;
(949) 586-2910;
fax (949) 586-8812. ■



Left: upper and lower wishbones are standard buggy-tech, and allow camber to be easily adjusted. Note the swaybar and thick steering bellcranks with servo-saver. Below: the Monster Pirate has no center diff to unload, so the truck should have scads of traction. Check out the large-diameter vented brake disc.



OFNA is now distributing this Picco .21, and the Monster Pirate is available with the powerful mill. The manifold and tuned pipe are also included.

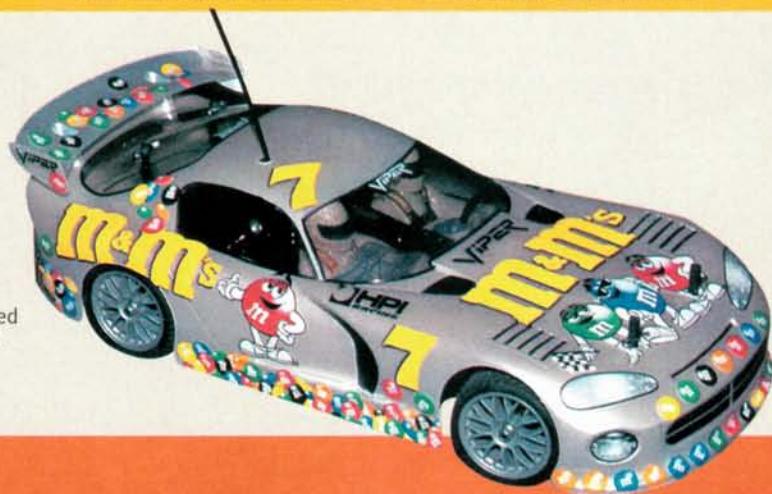


Win a \$500 gift certificate from DuraTrax! Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids), and a brief description, to Readers' Rides, RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free RC Car Action decal sheet and will be eligible to win a \$500 gift certificate from DuraTrax in the "Readers' Rides of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. Good luck!

Readers' Rides

Robin Trachten HPI RS4 Rally

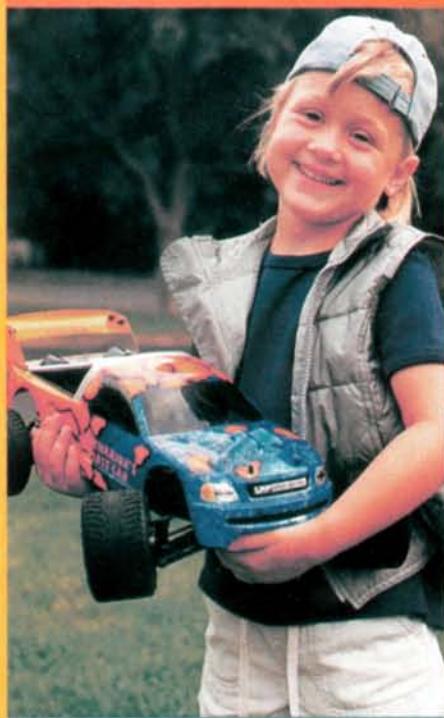
Robin Trachten, owner of HobbyTown USA in New Milford, CT, wanted something different from the Impreza body that came with her HPI RS4 Rally. After searching through the Lexan in the store, she found just what she was looking for; even the body-mount holes of the HPI Viper body matched up. The paint is Faskolor pearl white, and a set of Ernie Irvan Slixx graphics completes the Mopar.



Dave Nguyen HPI RS4 Minis

Dave Nguyen of Sunnyvale, CA, and his brother-in-law Jon Nguyen own this collection of HPI RS4 minis. The two electrics are powered by Tekin G-12 ESCs with Trinity D3 8T Quints and Team Orion 2000mAh batteries, and the nitros are powered by an O.S. Max .15 engine and a .15 CV-X engine. Both engines are equipped with Motor Saver filters. Among the modifications to the cars are HPI Mini Super and carbon-fiber chassis, graphite upper deck, graphite front and rear shock mounts, HG alloy shock and body mounts and rear shock tower, MIP CVDs, MIP Boost Bottle,

Dynamite ball bearings, HPI mini swaybars, lightened flywheel, heat-sink motor mounts and plates and HG sprint retainers. Traction comes from Kawada 8-mesh mini wheels, Tamiya Mini Cooper wheels and HPI mini Star wheels, all with HPI X-pattern belted mini tires. They also use HPI foam inserts and alloy parts by Cross Racing. All are modified for drag racing.



Katharina Klumpp HPI RS4 MT

Five-year-old Katharina Klumpp of Riverside, CT, didn't need to wait another 11 years to get her first taste of driving a car. She helped her Dad, Eckart, build this HPI RS4 MT. It's equipped with an LRP Runner reverse digital ESC, V10 17x4 engine and Wild Pack batteries. Other features include Boca high-performance bearings, a KO Propo radio and clear shock bodies from HG. You go, girl!



Donald Cowart Custom RC10 GT Sprinter

This Outlaw Sprinter built by Donald Cowart was initially an RC10 GT. He added a Bart's Parts conversion—Lunsford turnbuckles and hinge pins, MIP CVDs; header, four-in-one clutch, Robinson gear

assortment and CVEC inline pipe, all powered by a NovaRossi Top 12 competition engine, controlled by an Airtronics M-8. The wheels are Bart's aluminum beadlocks with foams. Donald runs this beauty at the Deep South Oval Racers track in Baton Rouge, LA.

Readers' Rides

Paul Mori HPI RS4 Rally

This HPI RS4 Rally was built by Paul Mori of Rego Park, NY. Paul's "new baby" has a Speed Gems 2 Opal 10-3 motor under the hood. The motor is connected by Deans Ultraplugs and 14-gauge wires to a Trinity 3000 Heavy Metal battery from Panasonic. It's also equipped with a Novak Super Rooster, an Airtronics Hi Torque ball-bearing servo and working brake lights. An Airtronics Rival Sport radio controls the car.



Joe Orzolek Tamiya TL01

Joe Orzolek of Bloomsburg, PA, has a Tamiya TL01 powered by a Trinity Chameleon motor. It's also equipped with a full set of ball bearings, Tamiya M2 radial tires and a Protoform Porsche Boxster body. He uses a Futaba Magnum Sport radio for control.

JT Austin Bolink Legends

JT Austin, an employee of WKRR Rock 92 in Greensboro, NC, built these Legends and convinced the company they'd be a great attraction at the radio station's remote broadcasts. The cars feature JR Python radios and ESCs, stock Reedy Firehawk motors and full bearings. Driving the cars "on location" has given JT a way to get paid for playing.



Oseas DagDag Tamiya TAOF-3 Pro, Clod Buster

Honolulu's Oseas Dagdag has the best of both worlds with his "Sting" Tamiya TAOF-3 Pro and Bigfoot Clod Buster. The Tamiya TAOF-3 Pro is equipped with hop-up springs, swaybars, a Novak Cyclone ESC, a Trinity T-Tech

12T-Triple motor and a Trinity 2000mAh stick pack. It's finished with an Elite Mustang body. The Bigfoot features an ESP Clodzilla IV racing frame, Losi springs, a Novak Polaris receiver, a Tekin Titan and Pro-Line Giant Trac tires. It's powered by a Trinity Speed Gem motor and Trinity 2000 mAh batteries and sports a Parma "Bigfoot" Ford F-150 body. Both vehicles are controlled by Airtronics radio gear. ■



Pit Tips

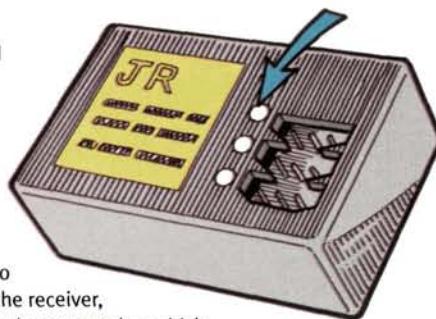
BY JIM NEWMAN

Radio Control Car Action will give a 6-month subscription (or an extension of your existing subscription) for each of your ideas used in "Pit Tips". Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.

Plug Problem Prevention

JR Racing receivers and those of some other manufacturers do not have polarized plug shapes, and when using a brand of servo that's different from the receiver, that can make it difficult to remember which side of the plug is the signal wire. On the receiver case, mark the signal side of the plugs with a white dot to avoid problems with incorrect polarity.

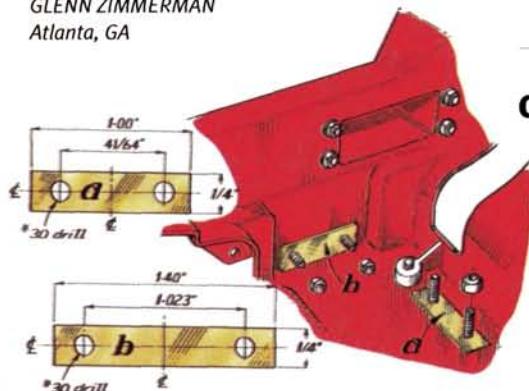
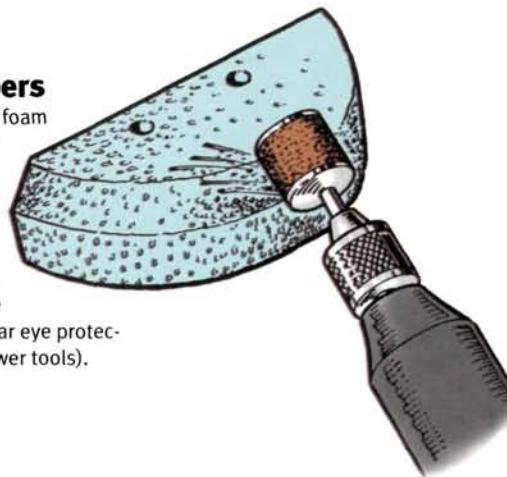
GLENN ZIMMERMAN
Atlanta, GA



Better Bumpers

After trimming your foam bumper, use coarse sandpaper to get rid of that hacked-off look. For a truly professional look, use a drum- or belt-sander to shape the bumper (always wear eye protection when using power tools).

ROGER BENNITT
Boulder, CO



Clod Chassis Beef-Up

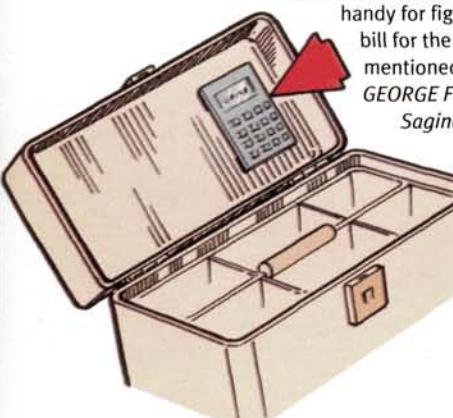
Strengthen your Clod Buster's chassis by bracing the ladder-bar pivot balls with brass straps. Just cut them to shape and drill as shown (b for the side straps, a for the bottom straps), and screw them into place. Now the pivot balls won't get torn out of the chassis when the going gets rough.

CHARLES BERECZKI
New Haven, CT

Pit-Box Calculator

Tired of calculating gear ratios and rollout on the back of a pizza box with your good body-detailing pen? Servo-tape an inexpensive calculator to the inside of your toolbox lid to make quick work of any number-crunching—also handy for figuring the bill for the aforementioned pizza.

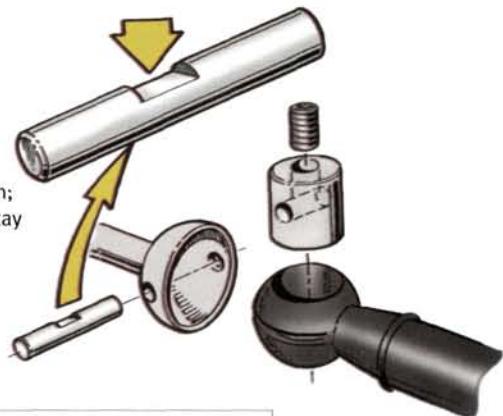
GEORGE FERRIS
Saginaw, MI



Pin-Loss Prevention

Don't lose another MIP CVD pin; file a small flat on it so it will stay in place even if the setscrew backs off a hair.

FRANK NEUNER
Harrisburg, PA



Removable Receiver Seal

To prevent dirt or fuel from entering your receiver, apply a few drops of "liquid electrical tape" (there are a few brand names to choose from; all work well) to the servo and ESC plugs where they enter the case.

Unlike silicone or RTV sealants, the liquid tape is easily removed.

BRUCE MANN
Katonah, NY





Pit Tips

Clean, Fast Filter Oiling

Oiling air filters is usually a sticky affair, but this tip makes it neat and easy. Just put the filter in a Ziplok bag with a dollop of oil; you can now squish oil into the filter without lubing up your hands in the process.

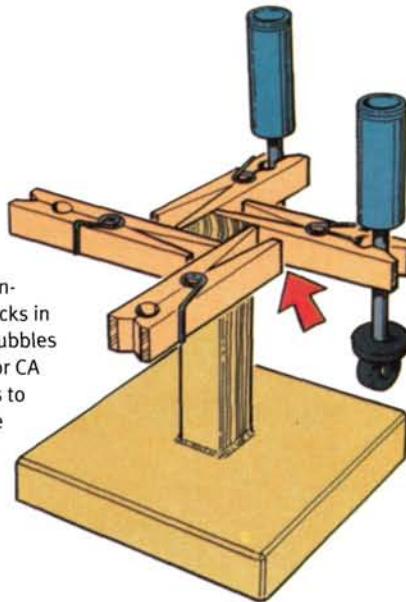
BRIAN SCOLLON
Daytona Beach, FL



Simple Shock Station

After filling your shocks and tapping out the largest air bubbles, use this easy-to-construct jig to hold the shocks in position while the tiny bubbles escape. Use white glue or CA to attach the clothespins to the stem, then clamp the unit in a vise or attach a scrap-wood base.

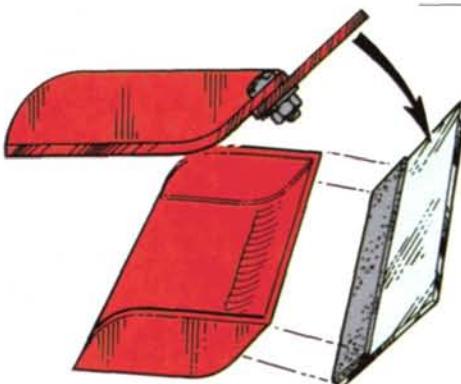
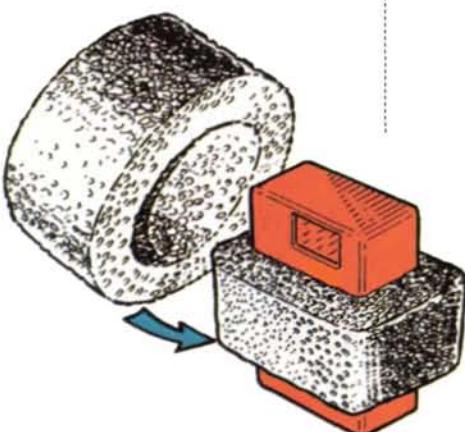
HANK RILEY
Newtown, CT



Tire-Liner Protects Receiver

Don't throw away those too-soft foam tire liners! They make perfect wraparound padding for your receiver and receiver packs.

HANS GOLDENBECK
Nashville, TN



Dialed Downforce

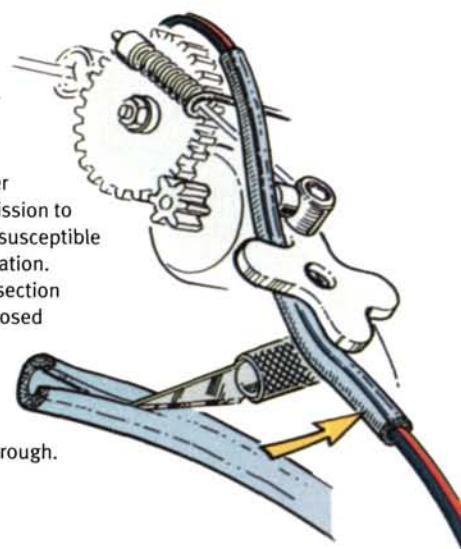
You can easily add downforce to your rear wing by increasing its surface area (and height) with a strip of Lexan. Servo-tape the Lexan into place to test it, then, when you have the setting you want, bolt it securely to the wing with 4-40 screws and mini-locknuts.

HECTOR RAMIREZ
Los Angeles, CA

Wire Protector

Most gas trucks require that the receiver battery wire be snaked over the transmission to reach the receiver. This makes the wire susceptible to damage caused by abrasion and vibration. To prevent this from happening, split a section of fuel tubing and slip it around the exposed wire. This tip is also handy for receiver installations in which the antenna wire must cross the chassis to reach its mount. No need to split the tubing for an antenna wire; just thread the wire through.

OSCAR GOMEZ
Palo Alto, CA ■



Troubleshooting

BY PETER VIEIRA • ILLUSTRATIONS BY JIM NEWMAN

The Final Word on Glitching

I have a Traxxas Rustler that will not stop glitching. It doesn't matter how close or far away the truck is or how fresh the batteries are; it just will not run properly. It stutters and twitches, or takes off, then stops. It's really frustrating. Please help. [email]
JUSTIN WILBUR

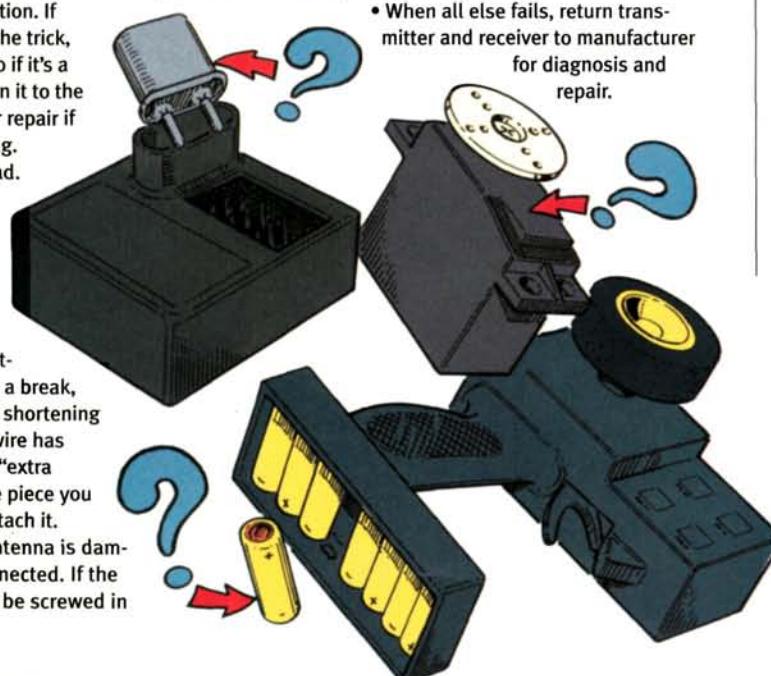
OK, gang: this one's a keeper. Here's everything you need to fix a glitch. If you get to the end of the list and haven't solved the problem, it's time to take up stamp-collecting. Save this page!

- Radio batteries are dead or dying. Replace/charge transmitter batteries and receiver pack (if you have a gas car).
- Radio batteries are installed incorrectly. Make sure you don't have a cell in there backward!
- Bad cell contact in transmitter or receiver battery box. Make sure the little metal tabs or springs that touch the cells are clean and actually contact the cells.
- Receiver pack leads are frayed (gas car). Replace or repair pack or battery box.
- Receiver is improperly installed. Cushion the receiver with foam if it's installed inside a radio box. On plate chassis, install the servo on its side with the antenna up. Do not run the antenna along graphite or aluminum chassis plates.
- Bad servo. If the "glitch" is only in one servo, it's probably not a radio glitch at all. First, try mounting the servo with the included rubber grommets (the little black things you threw away, remember?) to insulate it from vibration. If that doesn't do the trick, replace the servo if it's a cheapie, or return it to the manufacturer for repair if it's worth keeping.
- Crystals are bad. Replace transmitter and receiver crystals.
- Antenna wire is frayed, severed, or shortened. If you find a break, repair it without shortening the wire. If the wire has been clipped of "extra length," find the piece you cut off and re-attach it.
- Transmitter antenna is damaged or not connected. If the antenna cannot be screwed in

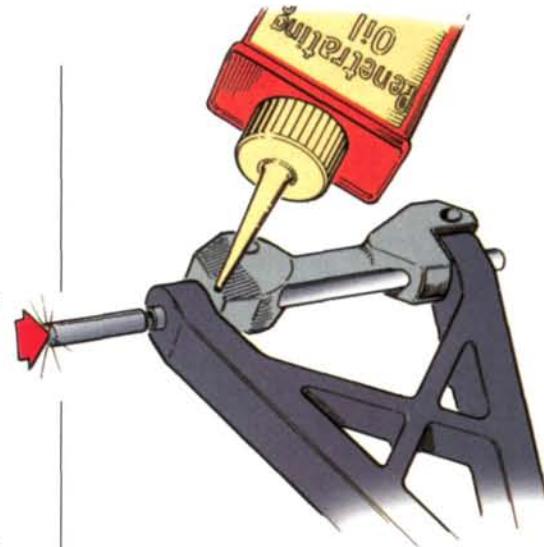
until it's tight, the internal mount may be loose. Carefully open the transmitter to check it out. Also check the wires that attach to the mount; if they are broken, that's your problem.

- ESC or servo plugs are damaged or dirty. Make certain that the metal contacts are fully inserted into the plugs. Clean the plugs and the prongs in the receiver with an electronics- and plastic-safe spray cleaner.
- Capacitors are not installed on motor (electric car). Install the capacitors recommended by the kit or ESC manual.
- Motor brushes are severely worn or broken. Replace brushes.
- Motor brush shunts are frayed or broken. Replace brushes.
- Commutator is severely worn. Remove the comm and have it trued; if it can't be saved, replace the armature or the entire motor.
- Bad BEC in electronic speed control. Return the unit to the manufacturer for diagnosis/repair.
- Worn out mechanical speed control (electric car). First, try to salvage it by cleaning the contacts and wiper arm. If that doesn't do it, replace it, preferably with an ESC.
- Loose metal parts. This is almost exclusively a gas-car issue. Loose, vibrating metal parts create a lot of electrical "noise." Make sure everything is tight.
- Clutch bell is rubbing flywheel (gas car). Another metal-on-metal "noise" issue. Put a shim or two between the clutch nut and the clutch bell. Be sure the clutch bearing is lubed, too.

- When all else fails, return transmitter and receiver to manufacturer for diagnosis and repair.



If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.



De-Binding Hammad Ghuman Arm Mounts

I like to jump my Associated RC10 T3 at the local BMX trails. After breaking the molded arm mounts twice, I decided to beef up my truck with machined aluminum Hammad Ghuman rear arm mounts. These were easy to install, but they have since bound up. I tried to take them apart to clean them, but the hinge pins are frozen in the arms, and I can't get them out. How can I remove the hinge pins without destroying the arms, and how do I prevent this from happening again?

TOM SAMILJAN
Asbury Park, NJ

Grease is the word, my friend (great—now I've got Frankie Valli stuck in my head). Those hinge pins froze up thanks to a galvanic reaction between the aluminum arm mounts and the steel hinge pins. It's a common problem in bicycles, where aluminum seat posts are inserted into steel frames. Unless the post is greased, the parts will just about weld themselves together. The same holds true for your hinge pins; coat them with a film of grease, and you'll have no problems.

That takes care of prevention; you still need to get those pins out. I suggest you drizzle some Liquid Wrench into the hinge-pin/arm-mount joint where the exposed hinge pin runs along the arm mount, then chuck the arm mount in a vise, so you'll be able to use a hammer and punch to drive out the hinge pin. Don't have a punch? You can use another hinge pin as a punch. A few gentle taps should do the job.

Troubleshooting

No Brakes

I received a Thunder Tiger Rain-X Camaro for my birthday (a major change from my Tamiya Super Blackfoot). The brakes worked when I first ran it, but now it has no brakes. I use Futaba S3003 servos. Help me!

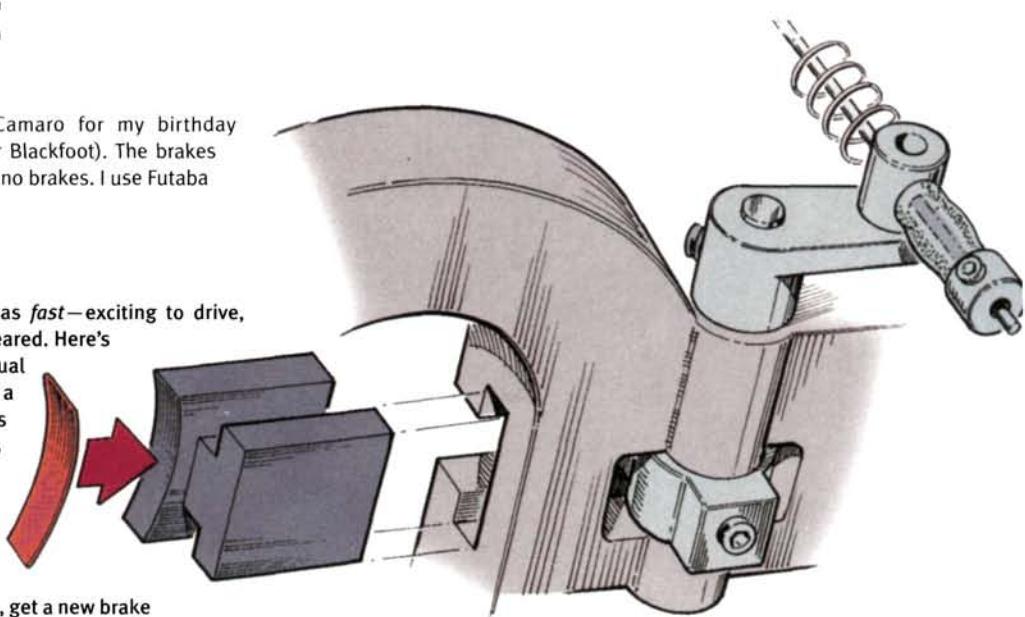
MICHAEL NEWMAN
 Sharonville, OH

I had one of those Camaros, and it was *fast*—exciting to drive, too, especially when the brakes disappeared. Here's

the deal, Mike: if you check the manual (you saved it, right?), you'll see there is a sliding block in the right bulkhead that is pushed against the clutch bell to act as a brake shoe. If the brake isn't properly set, it will rub the clutch bell constantly and will quickly wear away. Even if the brake shoe is set properly, a few tanks of fuel are usually enough

to wear it into uselessness. Try this: first, get a new brake shoe. Before you install it, carefully CA a thin sheet of brass

to the area of the shoe that contacts the clutch bell. Before you glue it, make sure the brass pad does not interfere with the release of the brake. This modification should prevent the brake shoe from wearing, but if you ride the brakes or if the brake shoe drags on the clutch bell, you may still melt the brake. Be sure to double-check the brake setup, and avoid long, gradual brake application.



Unequaled Precision



Absolute Series Spur

Available in 48P in 80T thru 91T, this is the quietest spur you can buy!
 RRP 1780 - RRP 1791

B3 / T3 Lite Aluminum Outdrives



Blue anodized and 40% lighter than stock ball diff outdrives.
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Absolute Series Pinons



Available in 48P in 16T thru 28T sizes. Super hard, lightened and cut unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone!
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Unsurpassed Reliability

Associated Blue Lightened Slipper Kit



The rear plate is hard anodized to reduce wear and the front plate is color treated. The front plate is designed to hold the slipper pad forcing the pad to slip on the rear plate. When pad shows sign of wear just flip it over for a new surface. Metal parts are CNC machined for a flawless fit. RRP 1515

RC10-GT Gas Spur



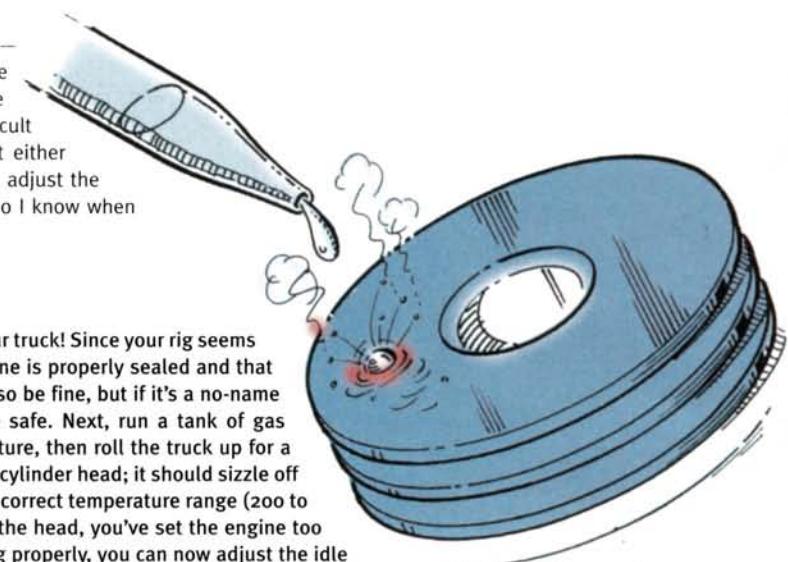
Super tough and precision machined from heat-resistant plastic, these spurs mesh flawlessly with our Clutch Belts. 32P spurs in 54T thru 67T, RRP 2261 - RRP 2267, and 32P belts in 14T (New) thru 24T, RRP 2214 - RRP 2224.

Idle Thoughts

I recently purchased my first nitro-powered RC vehicle—an OFNA Monster Blazer. My hobby dealer advised me to purchase an O.S. Max RG engine; he claims it's the easiest to tune. That may be true, but I have had a difficult time getting the engine to maintain an idle without either flaming out or burning up the clutch shoes. Should I adjust the idle setting while the engine is running? Also, how do I know when my engine is running too hot?

ROB SCHAFER
Ellensburg, WA

Rob, thanks for sending that great wheelie shot of your truck! Since your rig seems to run fine once it's started, I'll assume that the engine is properly sealed and that the fuel lines are leak-free. Your glow plug should also be fine, but if it's a no-name cheapie, swap it for a brand-name plug, just to be safe. Next, run a tank of gas through your truck to get it up to operating temperature, then roll the truck up for a "water test." Just drip a single drop of water onto the cylinder head; it should sizzle off in 5 to 7 seconds when the engine is operating in the correct temperature range (200 to 250 degrees F). If the droplet vaporizes when it hits the head, you've set the engine too lean and it's running too hot. With the engine running properly, you can now adjust the idle setting with the idle screw. As long as the clutch shoes aren't dragging, don't worry about the idle being set too high; 2-strokes never have a slow, loping idle. The engine should be able to accelerate crisply from a standstill after it has been idling for 10 seconds or so. Any 2-stroke RC car engine, even when perfectly tuned, may "load up" and stall if left idling longer than 10 seconds. Blip the throttle often to keep your engine "cleaned out," and have fun. ■



Superb Quality



RC10-GT Steel Combo

Precision machined one-at-a-time from a single piece of steel and then hardened this 65T spur and 15T bell combo will last and last. The extra-hardened clutch bell fits ALL Associated and MIP shoes. RRP 2365

Associated Titanium Stealth Top Shaft



CNC Machined from a single piece of titanium, this super hard, super light top shaft will fit any Stealth transmission. No serious racer should do without this part. RRP 1512.

Intelligent Innovation



RC10-GT Hardened Steel Idler Gear

Cut from solid steel stock, this gear is lightened and then hardened for super quiet precision and extra long life. Jamin' tranny grease is included. RRP 2213

Thoughtful Design

RC10-GT Hardened Diff Gear



Hard anodized, precision machined aluminum diff gear. RRP 1513



1999 World Cup and National Champion

"I only care about performance, and that's why I run Robinson Racing gears and slipper clutches exclusively."

— Richard Saxton

ROBINSON RACING PRODUCTS

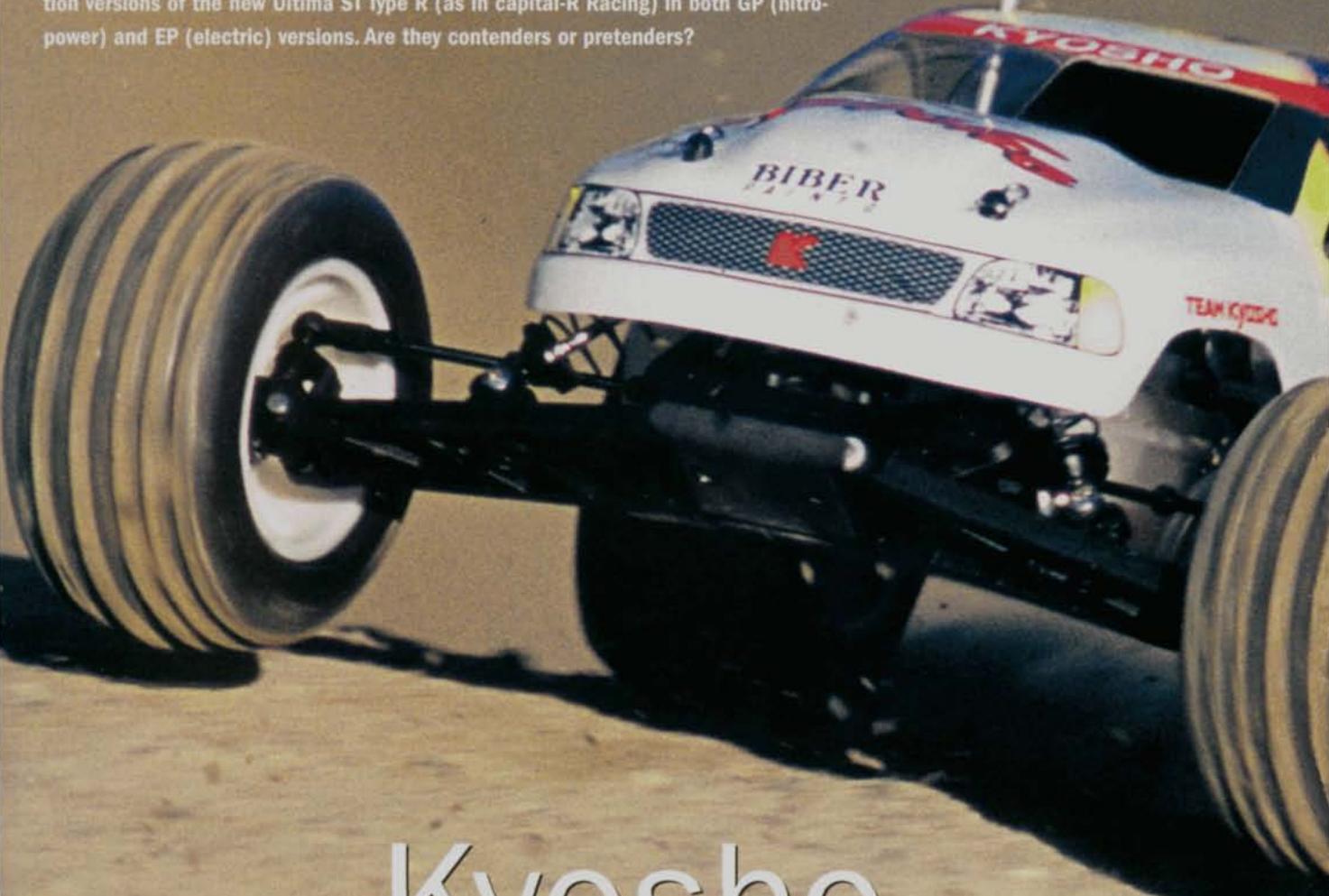
4968 Meadow View Drive • Mariposa, CA 95338 • Voice 209.966.2465 • Fax 209.966.5937



What does the name "Kyosho" mean to you? Most of you probably think of the $\frac{1}{8}$ -scale K-cars or the Touring Force line, but I doubt any of you think of a Kyosho* electric off-road racing machine (if you're an old-timer who said "Optima!" or "Rocky!," that doesn't count).

Kyosho once challenged Associated and Losi at the highest levels of off-road competition, and Joel Johnson even drove an Ultima into the history books with an IFMAR World Championship victory in 1987. Unfortunately, Kyosho lost momentum after that win. After soldiering on with the Triumph and the forgettable Pro-X series, the K-crew folded the pit tent and decided to stick with the more lucrative touring-car and "enthusiast" vehicle markets.

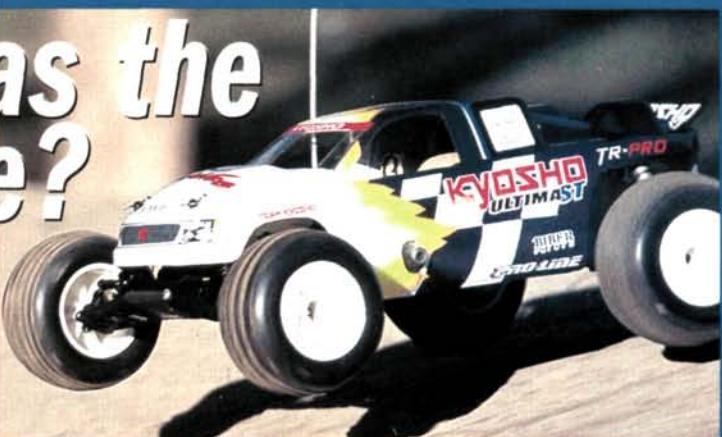
Now, Kyosho is planning a well-timed millennium comeback with a pair of trucks that aim to restore the luster of the Ultima name. I had the chance to build and drive preproduction versions of the new Ultima ST Type R (as in capital-R Racing) in both GP (nitro-power) and EP (electric) versions. Are they contenders or pretenders?



Kyosho Ultima ST Ty

Are the Ultimas the Ultimate?

by Peter Vieira



PARTS IS PARTS

As any racer will tell you, trackside maintenance and repair are inescapable, and unless you have a complete spare kit to rob parts from, you had better be sure the rig you race is well supported with spare parts in the hobby shop. It's not unusual to see racers who might prefer another brand of vehicle stick with the local favorite because a shop doesn't carry an adequate supply of parts for the kit they really wanted.

This concern has kept some racers away from Kyosho cars in the past, but the new Ultimas are cleverly engineered to be very friendly with the parts Losi and Associated drivers will have in their pit boxes. Most notably, the Ultimas use Pro-Line wheels that are interchangeable with Associated and Losi hoops (although Associated rims are the best match). If you already have money invested in rubber and rims, no worries; they'll bolt right on. Standard spur gears are also a direct fit, thanks to the properly spaced and tapped holes on the slipper clutch. The kit includes metric hardware, but another pair of 4-40 holes stands ready for the ubiquitous "American" hardware already in your spares box.

Likewise, the Ultima ball diffs are equipped with Losi- and Associated-standard $\frac{3}{32}$ diff balls, so you're just about guaranteed to find them on your dealer's shelf.

Kyosho's final step toward wide acceptance of the new Ultima line is racer-friendly parts packaging that will allow shops to easily carry the most requested parts. For instance, instead of buying an expensive parts tree with body mounts, bulkheads, shock spacers and other widgets you don't need just so you can get the front suspension arms that happen to be on that tree, Kyosho packs a pair of arms separately. If all you need is arms, all you buy is arms.

Will it work? That's really up to the racing community. But the trucks look good, and Kyosho seems very serious about giving racers what they're asking for.

WE DRIVE IT

Although the trucks featured here were deemed prototypes, the usual rough finishes and handwork common to true protos were absent; Kyosho probably wanted to hold off on officially tagging these "production" so that the engineers could still make changes. But if it's up to us, we say, "Don't change a thing!"

Both Ultimas are notable for the traction they produce, particularly the nitro model. We've had plenty of experience with Pro-Line Bow Tie tires (the Ultimas were equipped with these), and the Kyosho trucks seemed to pull more stick out of the tires. We theorized that the low-CG tranny and slightly forward engine mounting helped plant the gas truck, and whatever subtleties of suspension geometry helped produce the stuck-like-glue feel on the gasser also enhanced the handling of the electric truck.

Although not part of the driving experience, the Kyosho machines should also be praised for their convenience features; the hinged battery strap, easy-access servos, molded battery box and well-designed subassemblies made both trucks a pleasure to wrench on in the all-too-short time we had with them. We're looking forward to a full-on "Track Test" of the Ultimas that will allow us to build up the trucks from kits. But until then, we salute the Big K: these trucks are done right.

per

ULTIMA ST GP SPECIFICATIONS

DIMENSIONS

Wheelbase 11.6 in., 284mm
Width 12.4 in., 315mm

WEIGHT

As tested 67.2 oz., 1,905g

CHASSIS

Type Stamped plate
Material 6061 aluminum

DRIVE TRAIN

Transmission Sealed gearbox, 3-gear
Engine clutch Centrifugal, 2-shoe
Slipper clutch Single-disc type
Drive axles Steel universal joint
Differential ball (12, 3/32 balls)
Bearing/bushings Shielded ball
bearings

SUSPENSION

Type Lower A-arm/upper link
Camber links Turnbuckle
Damping Aluminum oil shock

WHEELS

Type Pro-Line dish

TIRES

Type (F/R) Pro-Line Edge/
Pro-Line Bow Tie



Genuine Pro-Line wheels and tires are supplied with both trucks (Bow Tie rears, Edge fronts), so the rolling stock is race-ready for most tracks. The bodies are unique to the Ultimas but are fabricated by Pro-Line. Combined with the dish wheels, the body delivers a look that will be right at home on the racetrack (and, hopefully, in the winners' circle).



The steering servo is held very close to the dual-steering bellcranks that incorporate an adjustable servo-saver. Turnbuckle tie rods reach out to the steering arms. The arms are held to the hub carriers by kingpin/ballstuds, and spacers allow the height of the steering arm in the hub carrier to be adjusted.

Left: the Ultimas have the latest racing-truck tech in their front ends; both machines feature combined kingpin/ball studs, top-mounted attachment points for the shock-shaft pivot, long steering arms, and easy-to-adjust turnbuckles with large flats. Note the aluminum hinge-pin brace, which is keyed to the front bulkhead.

TWO TRUCKS, ONE SUSPENSION

Identical suspensions outfit the gas and electric trucks, and Kyosho wisely decided to distill proven designs rather than attempt to reinvent the wheel. Composite suspension arms are secured to the front bulkhead via fixed arm mounts, while individual right and left arm mounts in the rear allow toe-in and anti-squat to be adjusted. Molded shock towers are used at both ends of the cars; there's no plate graphite or fiberglass in sight. The towers are artfully relieved of excess material and are constructed

of the same stiff composite material as the arms. Steel turnbuckle camber links are used throughout.

Bolt-on shock mounts attach the new "Twin Cap" dampers to the arms. The mounts raise the shock ends above the plane of the arms, much like the Associated RC10T3. The shock-mounting holes are cleverly arranged so that adjustments to shock angle do not alter ride height.

The shocks are named for their double caps, but the lower "cap" is actually a screw-in sealed cartridge.





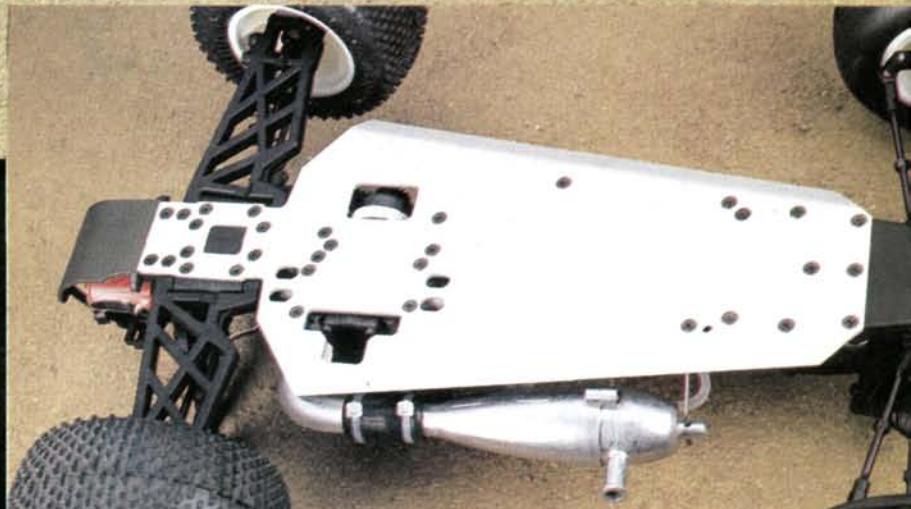
The single-disc slipper clutch is a high-quality aluminum turning, and it responds well to fine adjustments. Interestingly, the gear mount is tapped for a pair of 4-40 screws as well as the kit's metric fasteners. The vented-steel disc brake and padded caliper are visible just behind the slipper, and the clutch bell has been removed to show the 2-shoe internals.



Above: a knurled wheel allows servo-saver tension to be adjusted, and longitudinal servo mounting keeps the linkage short. Note that the bellcranks' drag link is adjustable.

The gold-anodized cartridge holds a pair of silicone O-rings secured by a wire snap ring. The top cap is designed to be assembled with or without a bladder, and it is also gold-anodized. The Twin-Cap design also allows the shocks to be filled from the top, or the top cap may be left on for Losi-style "bottom up" filling when the bladder has been omitted. No matter how you build them, the parts thread onto coated aluminum shock bodies, and a variety of pistons are supplied.

Below: the underside of the chassis is completely countersunk, including the engine-mounting hardware. Note the flush rear bumper and nose plate and the cutout that allows the tranny to hang through the chassis for super-low diff placement.



1st LOOK

CHASSIS

■ A molded semi-tub is the platform for the electric Ultima EP. It's basically a three-piece affair; there's the main tub, a plastic nose plate and an aluminum tail plate. The rear bulkhead is a separate part, and the front bulkhead incorporates the front arm mounts; individual arm mounts are in the rear. A molded battery strap conveniently hinged at the rear bulkhead holds the cells in place. A transponder mount is also provided, and is hung off the rear shock tower. To stiffen the nose of the chassis, a plastic brace links the front bulkhead to standoffs molded into the chassis.

■ The foundation of the Ultima GP is a 2.5mm aluminum plate that is stiffened by slightly folded-up sides. The front bulkhead is supported by a molded upper brace that is shared with the electric truck. A plastic upper deck/radio tray is held to the chassis via aluminum standoffs, and this incorporates a sealed box for the receiver. A splash guard is also molded into the radio tray to help prevent fuel from contaminating the throttle servo. A short plastic brace reaches over the engine to join the radio tray to the transmission, completing the chassis. The assembly feels appropriately stiff, but there is a bit of flex in the design.

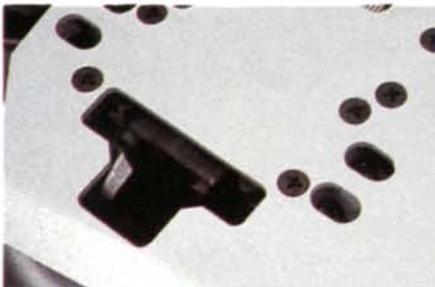
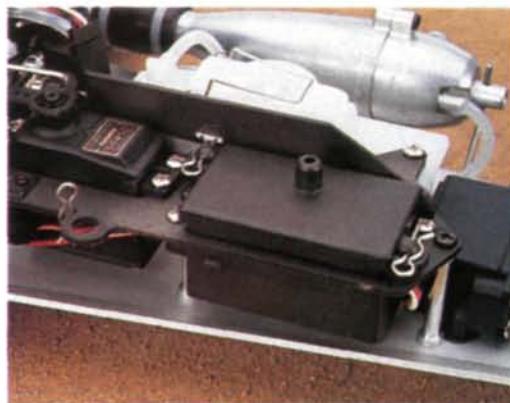
DRIVE TRAIN

Both machines use the same gearbox internals. Thankfully, Kyosho has ditched the belts and center-mounted diffs of old for a proven 3-gear, bottom-diff design. An all-new ball differential outfits the Ultima, and it accepts 3/32 diff balls for easy ball replacement and smooth action. Unfortunately, the diff is not externally adjustable.

A disc-type slipper clutch is installed on the transmission as well, and a Kyosho spur gear is supplied. In another move to greater parts compatibility, the gear mounting plate is threaded to accept metric screws as well as 4-40 screws and "standard" spur gears. The bearing-supported gear train in the electric truck is otherwise unremarkable, but in the nitro version the gears are aggressively laid down on the chassis. This delivers a lower CG and pushes the engine forward on the chassis. Both gas and electric transmissions use a molded rear cage on the rear of the transmission; on the electric Ultima, it protects the aluminum motor plate and motor; on the nitro, it houses the receiver pack.

To mount the engine in the nitro Ultima, cast engine mounts are supplied. These appear to be configurable for engines with or without pull-starters and are designed so the mounting screws are completely countersunk in the chassis.

Right: radio installation doesn't get much simpler than this. The receiver box has a molded-in antenna mount (nice touch), and a pair of body clips allow instant access. The large splashguard helps keep fuel away from the electronics, and the transponder mount with body-clip storage hole is a welcome convenience.



Left: the chassis is cut for pull-starter clearance, if your engine is so equipped. The engine mounts are two-piece units; the "fixed" parts are held to the chassis by countersunk screws, while access ports (the oval holes) allow a screwdriver to reach the fasteners that hold the sliding parts of the engine mounts.

Kyosho's engineers wisely refrained from designing an over-the-top technological tour de force of unproven ideas and stuck with refinements of proven concepts.

Right: this shot of the rear suspension reveals the unusual, notched rear arms and minimalist rear hubs (shared with the new TF-4 touring car, by the way). The rear bulkhead reaches up high on the shock tower for extra support.



SO FAR, SO GOOD

The new Ultimas are downright impressive. Kyosho's engineers wisely refrained from designing an over-the-top technological tour de force of unproven ideas and stuck with refinements of proven concepts. But don't make the mistake of underestimating the effectiveness of seemingly tiny tweaks to race-truck conventions; based on our experience with the new trucks, their performance belies the relative lack of eyeball-popping innovation. If you haven't already picked up a racetruck for the 2000 season, you would be foolish not to consider an Ultima.

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■

You knew it was coming

by George M. Gonzalez

The Team Losi* Triple-X buggy needs no introduction. On its very first outing, it won the highly competitive ROAR 2WD National Championship, and it has since become a favorite at club tracks around the U.S. Racers of all skills have benefited from its technological advances; many have even reported faster lap times when driving it.

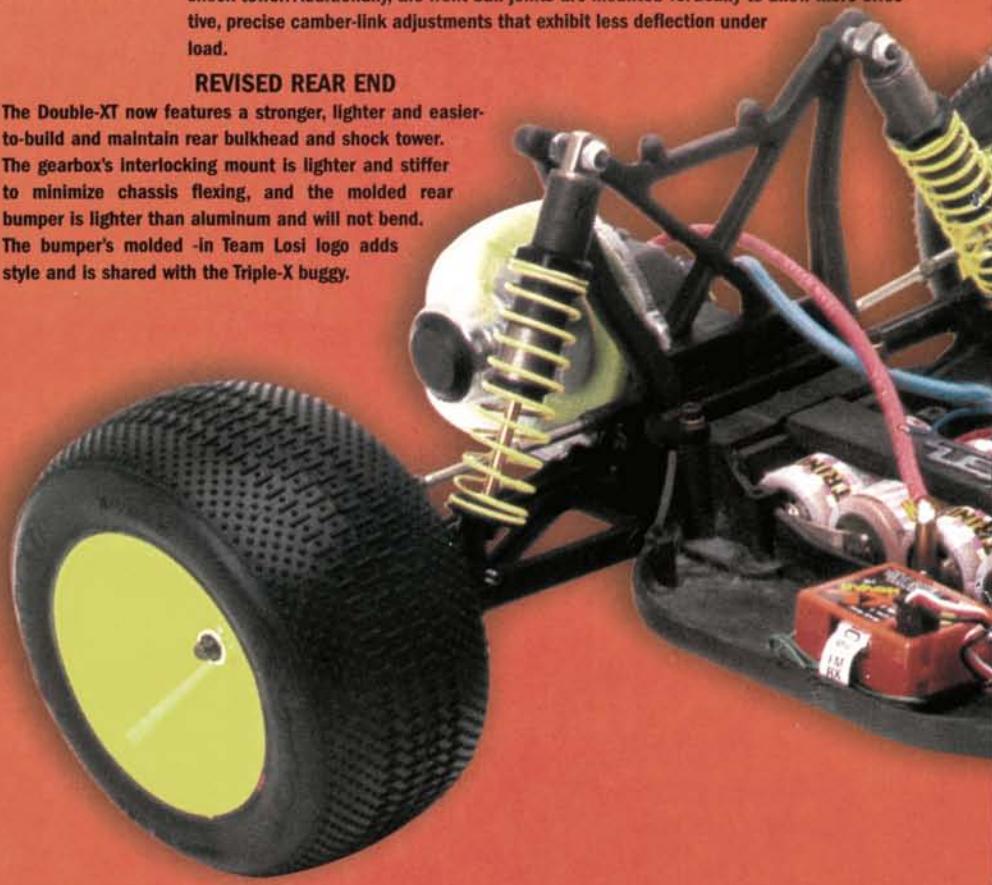
Team Losi will soon release the eagerly anticipated Triple-XT—a truck version of the venerable Triple-X—so truck racers will now benefit from many of the innovations that make the buggy a winner. Although the truck we show here is a preproduction prototype, it's very close to what you'll see on the shelves by the time you read this article.



NEW FRONT SUSPENSION GEOMETRY
Note the all-new camber-link locations and the suspension arms' length, which has been optimized to make the truck easy to drive—very forgiving. The front shocks are still at the rear of the suspension arm (the Double-XT 'CR's shocks are in front of the suspension arms) and 0.250 inch lower. According to Team Losi, the new front-suspension geometry does three important things: it lowers the vehicle's center of gravity (CG), reduces the twisting force on the front suspension arms and allows the use of a smaller, stronger shock tower. Additionally, the front ball joints are mounted vertically to allow more effective, precise camber-link adjustments that exhibit less deflection under load.

REVISED REAR END

The Double-XT now features a stronger, lighter and easier-to-build and maintain rear bulkhead and shock tower. The gearbox's interlocking mount is lighter and stiffer to minimize chassis flexing, and the molded rear bumper is lighter than aluminum and will not bend. The bumper's molded-in Team Losi logo adds style and is shared with the Triple-X buggy.



LONG CHASSIS

For increased stability, the Triple-XT's molded chassis is slightly longer than that of the Triple-X buggy, but it has all the same features. Its rounded corners and smooth bottom won't catch on pipe joints or other obstacles, and the vehicle's entire center section has been dropped by 0.100 inch to lower the CG without reducing ground clearance. Like its predecessor, the Triple-XT features a molded-in battery tray and molded battery strap to hold the cells on the chassis. Foam spacers allow you to move the batteries forward or backward to divert traction to where it's needed most.

Team Losi Triple-XT

GEARBOX

This is the same as its buggy brother's—a 2.43:1 internal gear ratio. This is a huge bonus if you happen to race both vehicles because you'll need to stock fewer spare parts. You'll also find the same extremely smooth double-slipper-clutch system and the same forward-mounted motor with its weight centered on the rear axles to increase rear traction.



REVISED STEERING SYSTEM

The steering bellcranks and idler arm pivot around an axis that's parallel to the kingpins and spindles. This provides zero bump-steer even when the wheels are at full lock in either direction. Team Losi claims that these innovations alone allow the Triple-XT to hold a more consistent, predictable line through the corners. The new design also allows the servo to be easily adjusted or removed—a feature that racers have grown to appreciate on the Triple-X buggy.

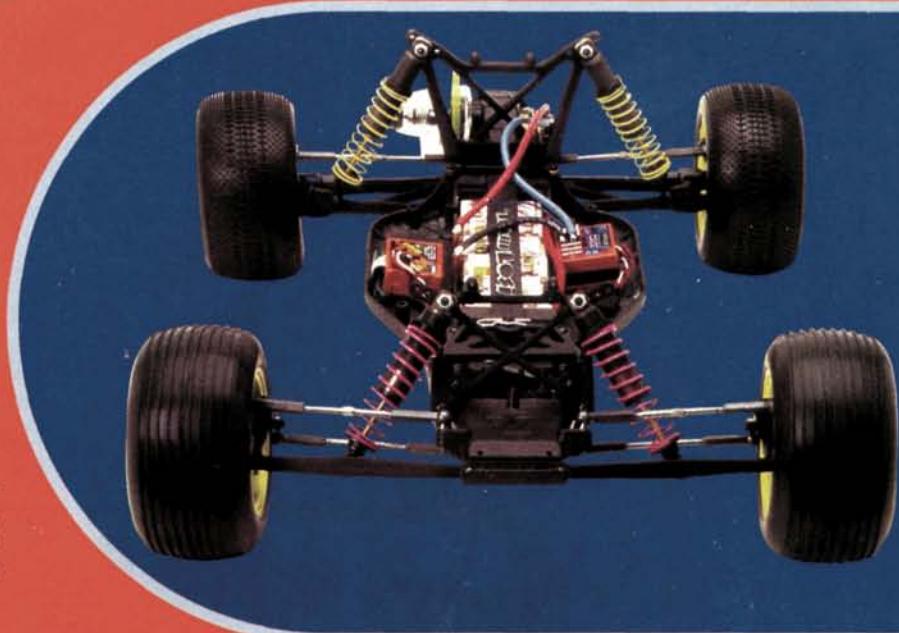


NEW DISH WHEELS

These new, bright yellow, one-piece dish wheels are stiffer than the Double-XT's, and they do not have a Lexan dirt guard. If you're like me and have grown fond of the earlier wheels, you'll be happy to know that all the wheels that fit the Double-XT will also fit the Triple.

LOW-PROFILE BODY

Lower, sleeker and lighter than the previous Double-XT body, the Triple-XT's new shell fits the chassis closely for a slammed look that is, in my opinion, much more appealing than its predecessor's.



SCALE $\frac{1}{10}$
VEHICLE TYPE

2WD stadium racing truck

CHASSIS

Type Semi tub

Material Molded-fiber composite

DRIVE TRAIN

Type Sealed gearbox

Primary Pinion/spur gear

Internal gear ratio 2.43:1

Drive shafts MIP CVD axles

Differential(s) Ball

Slipper clutch Losi dual disc

Bearings/bushings Sealed bearings

SUSPENSION

Type Lower suspension arm with adjustable upper link

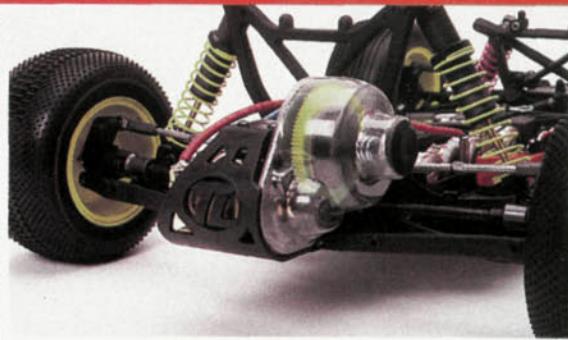
Linkage type Steel turnbuckle

Damping Aluminum-body,

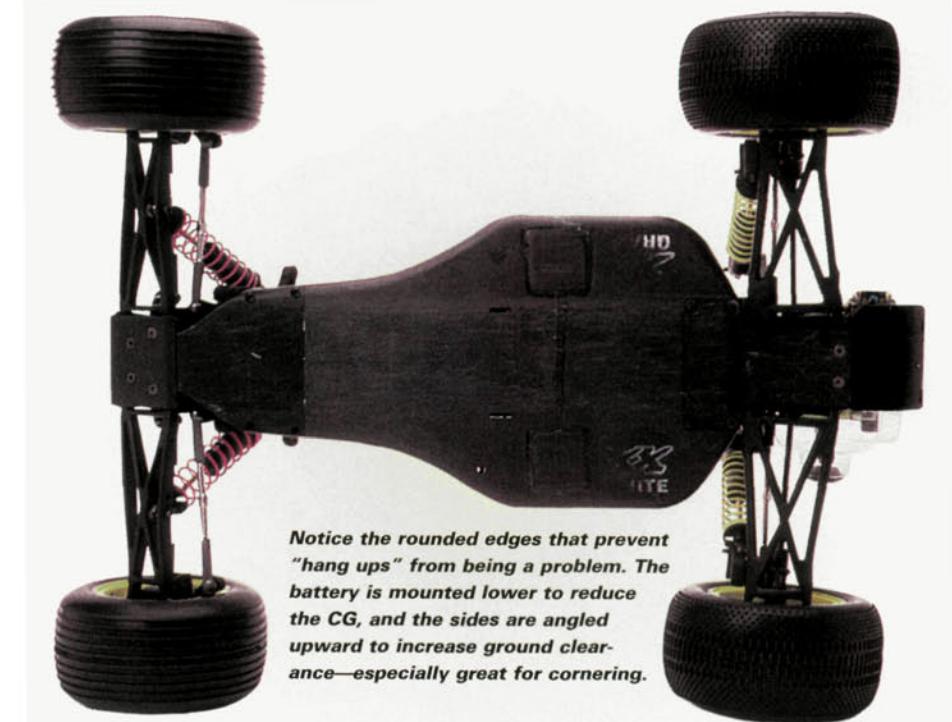
oil-filled, coil-over shocks



Gone is the swing-away front end; this makes this truck much easier to build, and it strengthens and stiffens the chassis. The steering system provides zero bump-steer through the full range of suspension travel.

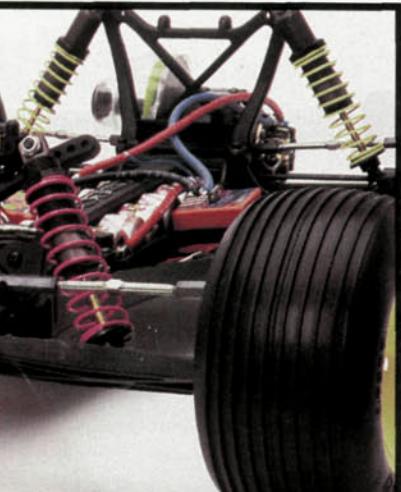


The Triple-XT's rear bulkhead is lighter, stronger and simple to assemble, while the new gearbox is easier to remove yet is attached to the chassis more securely than on the Double-XT platform. The internal 2.43:1 ratio is the same as the buggy version's, but a larger spur gear is provided with the truck.



Notice the rounded edges that prevent "hang ups" from being a problem. The battery is mounted lower to reduce the CG, and the sides are angled upward to increase ground clearance—especially great for cornering.

Left: the 30-degree steering and caster blocks are identical to the ones on the Triple-X buggy. Optional 25-degree blocks and carriers are available. Losi's new dish wheels outfit the Triple-XT, but Double-XT wheels are a direct fit on the Triple's aluminum axles. Below: pioneered by the Triple-X buggy, the unique camber-link mounting locations and back-of-the-suspension-arm shock-mounting concepts are cutting-edge stuff. The new truck also features a smaller, stronger shock tower and a sturdier front bulkhead.


FINAL THOUGHTS

Obviously, the brand-new Triple-XT race truck shares many parts with the highly regarded Triple-X buggy and very few parts with its predecessor. That makes it highly likely that the Triple-XT will be a popular, race-ready machine. Unfortunately, we couldn't get our hands on a test prototype, but rest assured, we'll soon be working on a Triple-XT "Track Test." Meanwhile, feel free to wallpaper your workshop with these photos!

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■

TRACK
TEST
1/10-SCALE ELECTRIC

DuraTrax Axis RTR

Bringing big buggies to beginners

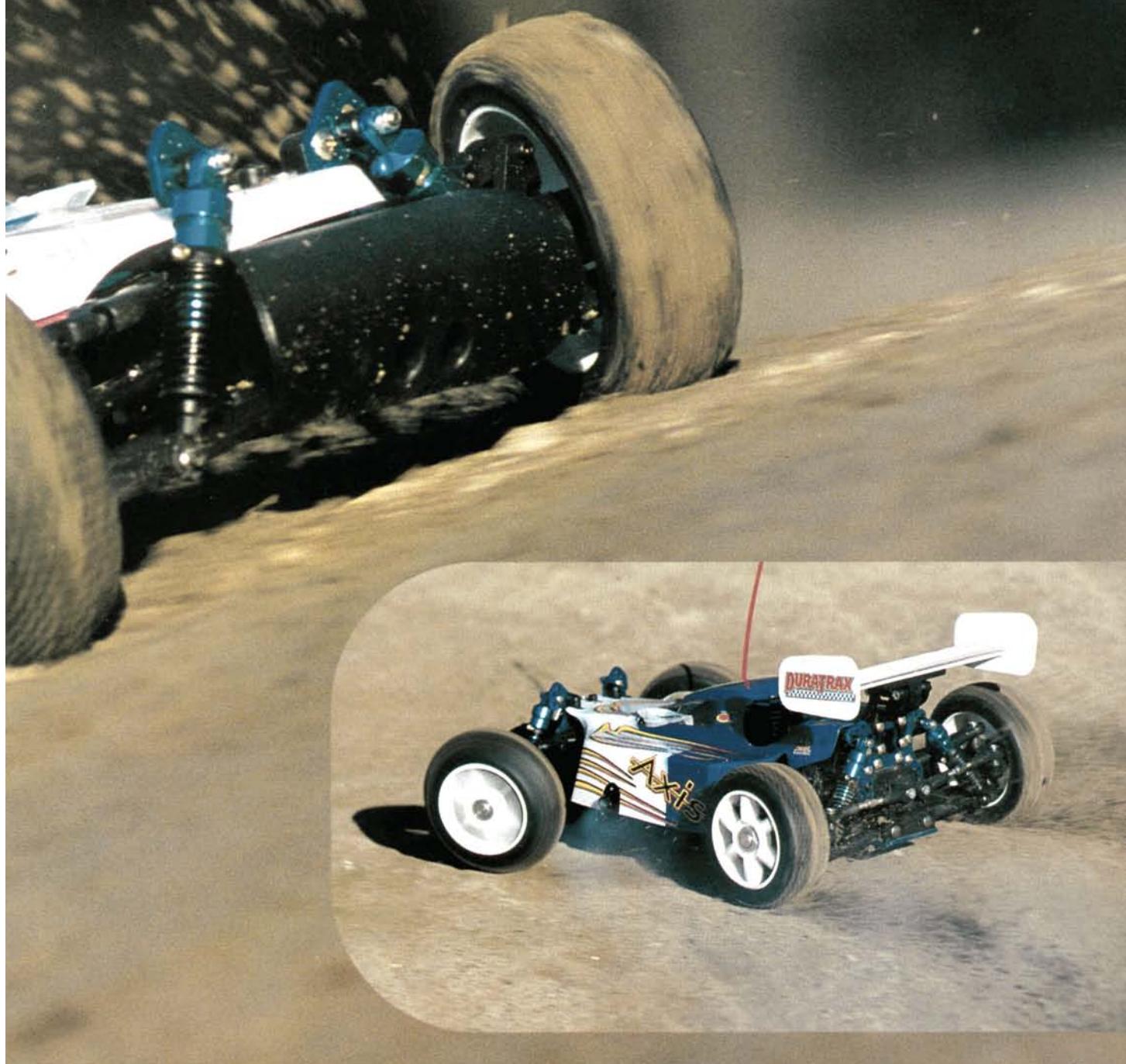
by Peter Vieira



PHOTOS BY WALTER SIDAS

There was once a time when nitro "anything" was deemed unsuitable for beginners, but the '90s saw that notion pass from popular belief and into the realm of antiquated ideas. Yet even today, most hobbyists would confidently say that $\frac{1}{8}$ -scale nitro buggies are not for newcomers, and, until very recently, they would have been right.

DuraTrax* plans to make $\frac{1}{8}$ -scale off-road action available to the masses with the Axis—the industry's first RTR big buggy. But don't look for a watered-down ride; while the Axis is loaded with convenience and user-friendly features, it's also packed with high-performance stuff that defies the usual "keep it simple" RTR convention.



TRACK TEST Duratrax Axis RTR

DATA CENTER

Vehicle type: ready-to-run, nitro-powered, $\frac{1}{8}$ -scale, 4WD off-road buggy.

Best buyer: newcomers to nitro, enthusiasts impressed (but perhaps intimidated) by the big stuff and any hobbyists more interested in hitting the track than the bench.

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions: good

Durability: good

Parts fit/finish: good

Overall performance: very good

LIKES

- Competent factory assembly and body finishing.
- Loves to jump.
- Well-equipped chassis with plenty of adjustments.

DISLIKES

- Loads of understeer makes it difficult to drive tight courses.

SPECIFICATIONS

SCALE $\frac{1}{8}$

AVAILABLE AT \$499

DIMENSIONS

Wheelbase 12.75 in.

(323.9mm)

Width 11.75 in. (298.5mm)

WEIGHT

Total, as tested 125 oz.

(3538 g)

CHASSIS

Type Double-deck

Material 3mm 6061-T6 aluminum

DRIVE TRAIN

Type Shaft

Primary Clutch bell/spur gear

Drive shafts (F/R) Universal, dogbone

Differentials Bevel gear

Bearings type Shielded ball bearings throughout

SUSPENSION (F/R)

Type Lower A-arm with wishbone upper link/upper and lower wishbone

Damping Oil-filled aluminum shocks

WHEELS

6-spoke one-piece molded plastic

TIRES

10-row mini-pin with foam inserts

ELECTRONICS (INCLUDED)

Transmitter Hitec Lynx AM

Receiver Hitec

Steering servo Hitec 605BB

Throttle servo Hitec HS303

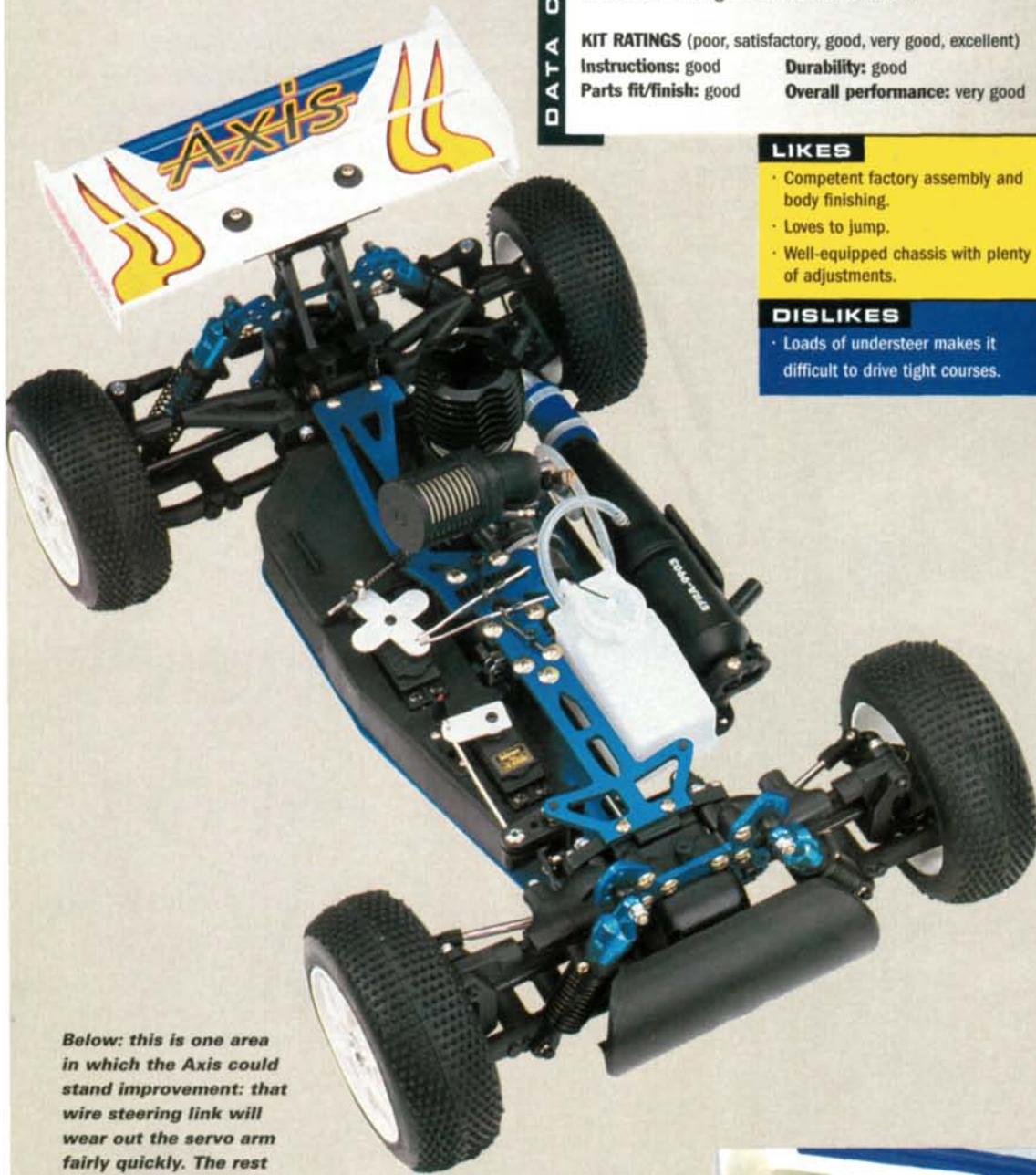
ENGINE AND ACCESSORIES

Engine DuraTrax Torq .21, rear exhaust, round port

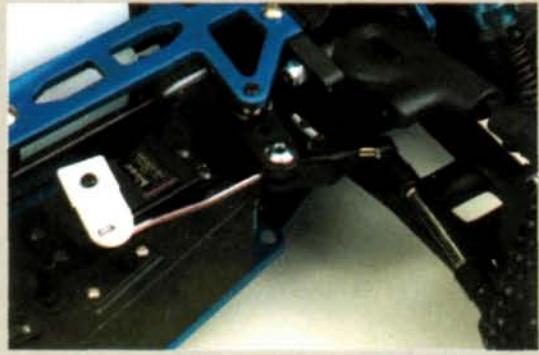
Carburetor Slide valve

Manifold Aluminum, spring-type

Pipe Molded tuned pipe



Below: this is one area in which the Axis could stand improvement: that wire steering link will wear out the servo arm fairly quickly. The rest of the steering parts are of top quality, as shown by the hefty tie rods and fat upper arms.



Right: these beefy rear turn-buckles allow rear toe-in to be adjusted. Check out the broad screw heads visible on the shock tower; the Axis is clearly built to take abuse.



KIT FEATURES

• **CHASSIS.** When in doubt, make it stout: that must have been the design credo when DuraTrax penciled in the specs for the Axis chassis because it is a heavy-duty chunk of aluminum. The double-deck design is constructed of 3mm, 6061 T6 aluminum, and the top deck stretches from the front to the rear gearbox as it braces the center diff. Every other buggy I've seen uses a combination of plate and rod braces, which usually leaves a few flexible spots. The Axis feels like a bridge abutment by comparison; it's solid.

The beefiness of the materials makes stiffening folds in the lower chassis plate unnecessary, but stamping front kick-up would have been welcome. The chassis is completely flat, while almost every other buggy now has a few degrees of kick-up stamped into the chassis. Is this a big deal? Nah. But since the rest of the Axis looks so good, I think it is worth mentioning.

Once you get past all the blue-anodized aluminum, you can't help but notice the coffin-like radio box that spans the entire right side of the chassis. The throttle and steering servos poke out of the box to do their thing, while a sliding door reveals the receiver and its 4-cell power supply (batteries are included, but to keep them fresh, they are not factory-installed).

building & setup tips

■ Watch the included video! It explains how to set and test the carburetor needle settings, check engine temperature and determine by its sound whether the engine has been set too lean or too rich. Even if the Axis isn't your first nitro-powered car, watch the video. The 10 minutes you spend in front of the tube could buy you months of hassle-free running.

■ The Axis fuel tank's molded-in mesh "filter" will prevent giant rocks from getting into the fuel, but any-

thing smaller will go right through. Do yourself (and the engine) a favor and install a fuel filter between the tank and the carburetor.

■ When the included receiver batteries breathe their last, upgrade to a 5-cell Ni-Cd receiver pack (you'll need to get a charger, too). The supplied cells have good voltage, but lack the "punch" of rechargeables. The servos will be more responsive with Ni-Cd power, and the receiver pack will soon pay for itself. Buying alkalines gets expensive!

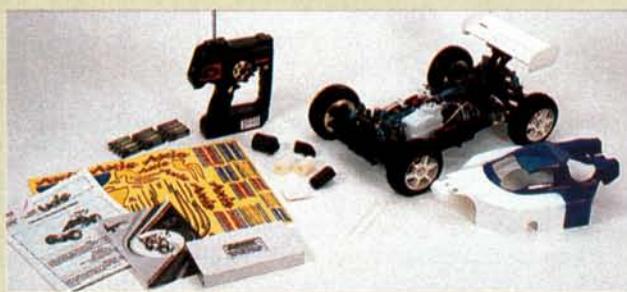
test gear

• **Hitec* Lynx AM transmitter and receiver.** This is the standard DuraTrax RTR setup also used with the Maximum series of vehicles. Throttle endpoints aren't adjustable, so the springs on the Axis' throttle linkages do get a workout, but the carburetor and brakes operate correctly, so no complaints here. The Lynx does offer dual-rate steering—a welcome feature—and the unique Steering Rate Override button

allows maximum steering travel in tight situations.

• **Hitec 605BB steering servo.** An 1/8-scale buggy is too much machine for a mere "standard" servo to steer, so DuraTrax supplies a more muscular Hitec 605BB unit. With a claimed 91 oz-in. of torque at 6 volts, this servo can capably control the big buggy.

• **Hitec HS303 throttle servo.** Hitec's standard servo is well-suited to pulling the Axis' slide



• **SUSPENSION/STEERING.** DuraTrax backs up the chunky chassis with suitably rugged suspension parts molded of Stress-Tech plastic. DuraTrax believes so strongly in the strength of this stuff that it offers a full, 6-month, no-breakage guarantee on the molded parts. You break it, DuraTrax replaces it free. That's cool.

The front suspension relies on proven 1/8-scale technology and features lower A-arms paired with adjustable, wishbone upper arms. The molded steering arms swing in bushed hub carriers, and thick, plated, 3mm hinge pins keep everything moving smoothly. The tie rods are threaded, allowing toe-in to be adjusted.

The rear suspension is more interesting: upper and lower wishbones are attached to the chassis via hinge pins, but the rear hub carriers are held in place by a single pivot ball in each upper and lower arm. If it weren't for the turnbuckle linkages that join the hub carriers to the rear gearbox, this untriangulated design would allow the rear wheels to flop around. These allow rear toe-in to be adjusted without disassembly. It's an unusual feature for an "entry-level" buggy, since most of the Axis' target buyers won't be interested in altering rear toe, but it could come in handy in a racetrack setting. Camber is also adjustable via the threaded upper wishbones, but minor disassembly is required.

The Axis uses identical front and rear gearboxes that incorporate arm mounts, and they make for some unusual suspension geometry. In the rear, the parts deliver about 3 degrees of anti-squat—a good thing. However, when that rear gearbox is turned around to become a "front" gearbox, it causes the front arms to slope downward from the rear of the arms to the front. The front hub carriers have molded-in caster to help compensate, but it will be interesting to see how the unorthodox geometry affects handling. If nothing else, the arms' "reverse caster" should help prevent the front end from diving under braking. We'll see.

YOU'LL NEED

- Fuel (10- to 20-percent-nitro recommended).
- Fuel bottle.
- Glow starter.

FACTORY OPTIONS

- Racing clutch spring—part no. DTXC7170.
- Steel main gear—DTXC8302.
- Swaybar set—DTXC9575.
- Titanium shock shafts (F/R)—DTXC9730/DTXC9731.
- Turnbuckle links (pair) 5x35mm—DTXC9748.
- Street Traction tires—DTXC8270.

for those hard-working servos, and performance will suffer.

• **DuraTrax Nitro Starter Set (not included).** I tested the Axis with this all-in-one package of nitro necessities (including glow-starter with charger, fuel, fuel bottle, glow plug and wrench) for the full DuraTrax RTR experience. The included 10-percent-nitro fuel is easy on the engine, the fuel bottle has a bent spout for easy filling, and the Hot Shot 2 glow starter is reliable and much more solidly constructed than the old heat-shrunk Hot Shot. My favorite items are the handy multi-wrench and genuine O.S. A3 glow plug (the Axis includes a plug, but it's always good to have a spare). The wrench has a gripper in the 8mm end that makes it easy to install and remove glow plugs, but unfortunately, the tool does not have a socket large enough to remove the wheel-mounting nuts.

TRACK TEST Duratrax Axis

Those arms, wishbones and linkages aren't much good without shocks; the Axis covers that base with large-volume, blue-anodized aluminum units that arrive filled with oil and ready for action. Damping feels firm but smooth as tested by a hand squeeze, and the springs seem stiff enough for rough stuff.

Because it's a ready-to-run kit, it's important that the suspension be reasonably well set up; if the buyer has to take the time to dial in the various settings, it defeats the whole RTR concept. Out of the box, the Axis had 2 degrees of camber and toe-in, which are good ballpark settings.

- **DRIVE TRAIN.** No self-respecting $\frac{1}{8}$ -scale buggy would run around without triple differentials, and the Axis is no exception. All three diffs feature plastic cases and bevel-gear internals. The center diff's main gear is plastic, but the front and rear diffs have hardened-steel ring and pinion gears for maximum durability. That's a great feature, since the typical Axis owner will probably be more interested in mayhem than in maintenance.

A pair of universal axles connects the front diff to the front wheels, while a pair of dogbones outfit the rear gearbox. Likewise, dogbones join the center diff to the front and rear units. The center diff is also home to the Axis' front and rear Fiberite II disc brakes, which may be adjusted independently. The factory setting delivers equal stopping power to all four wheels, but bias can be quickly adjusted, simply by moving the screw collars on the brake linkages. A complete set of 18 bearings (including two in the engine) is the final touch to this surprisingly well-featured drive train. Only the steering bellcranks are bushed!

- **ENGINE AND ACCESSORIES.** DuraTrax powers the Axis with its own Torq 21 engine, which also has a good mix of features. A pull-starter is the most obvious nod to the entry-level audience, but other touches show that DuraTrax does not intend the Torq 21 to be for beginners only. A slide-valve, 2-needle carburetor makes the engine fully adjustable, and dual crank bearings (with a sealed front bearing) should ensure durability. The sleeve is nickel-plated and appears to be of good quality. Ball bearings in the clutch bell (instead of plastic, caged needle bearings) are another plus in the durability category.



This interesting, adjustable mount all but guarantees the Axis' tuned pipe will stay put. Note the slotted holes that allow the pipe to be precisely positioned and the yoke that holds the pipe's tip with a screw.

The rear-exhaust engine accepts a round-port manifold that is held on via a spring that wraps around the engine. This spring is typically a "bear" to install, and that makes me glad that the Axis is RTR and extra glad that I'm not the guy on the Axis assembly line who installs those springs! A silicone coupler links the manifold to a molded pipe, which is held tightly by a very trick, molded-pipe mount. I won't miss wrestling with music-wire-type pipe mounts!

A flip-top fuel tank feeds the engine, and DuraTrax has hooked up all the plumbing for you. A primer isn't supplied, and that's actually a good thing, since they usually contribute to air leaks.

The tank is mounted for easy body-on access and quick fill-ups.

- **WHEELS, TIRES AND BODY.** Attractive 6-spoke rims and 10-row mini-pin tires with foam inserts connect the Axis to the ground. The rims are mounted on 17mm hexes—a standard size for $\frac{1}{8}$ buggies that allows the Axis to accept many rim and tire combinations. No assembly is required; the tires, rims and foam inserts are factory assembled and glued.

Like DuraTrax's other RTR vehicles, the Axis includes a painted and trimmed body. The paint scheme looks tame as it comes out of the box, but the included decals make it look much more race-ready. The included wing is easily attached to the fully adjustable wing mount with a pair of screws.

PERFORMANCE

Nothing tests the durability of an RC vehicle like a day of BMX track testing, and DuraTrax's Stress-Tech no-breakage parts practically dared me to put the big buggy on the injured list. Although I had a full day of carnage planned, I took it easy on the Axis as I broke it in according to the included video instructions.

After scooting around the parking lot through a few fat tanks of fuel, the Axis was ready for the dirt. I took a slow pass through the track's rhythm section to get a feel for how it would jump. Before I was even halfway through, I was feeling comfortable enough to get on the gas and put plenty of sky between the buggy and the track. After clearing the last roller, I goosed the throttle to see what the big machine could do. The Torq 21 felt a little soft compared with other $\frac{1}{8}$ -scale buggies I've run, but it still packed plenty of punch for fun driving.

The end of the straight I had picked for my speed run was fast approaching, so I fed in some steering to point the car into the banked left turn that the straight fed into. The wheels swung to full lock, but the Axis barely moved off-line as it understeered up and over the berm. To get the Axis to steer, I found it best to tap the brakes and pitch it into corners and then feed in steering and throttle to adjust the line. If you simply steer while under power, the Axis will push severely. Though that isn't the fastest way to drive, the understeer does allow the Axis to track very well, and that makes it easy to line up for jumps. The air is where this machine really shines. With its stiff (for an off-road car) suspension, the Axis likes to launch off jumps rather than "absorb" them. Simply by letting off the throttle in midair, the big buggy levels out and touches down on all fours. It never gets old!

Before packing up for the day, I subjected the Axis to some classic backyard-style hacking by banging around the ungridded land on the track site. Rocks and roots and tractor trails bounced the Axis around, but with .21 power and 4WD, there's little that can stop it. As long as the Axis doesn't get stuck seesawing on a tall obstacle, it will keep rolling.

After a full day of running and some sketchy jump attempts, I did manage to pop one of the Axis' parts. A run at a big set of doubles sent it into a hard tail-first landing that sheared off the rear wing mount. This crash was equivalent to dropping the buggy tail first off a step ladder, so I have no problem forgiving the breakage—especially since the part will be replaced free under the Stress-Tech guarantee.

THE VERDICT

DuraTrax did it: the Axis really is both a competent $\frac{1}{8}$ -scale buggy and a beginner-friendly nitro experience. Hardcore $\frac{1}{8}$ -scale off-road racers won't be too jazzed on the out-of-the box setup, but I doubt that anyone with competition experience is really looking at the Axis as a race rig. The latest DuraTrax RTR is ideal for its target buyer, however. It's easy to start and runs reliably, it will jump all day long, and the extra boost of .21 power and 4WD make every drive an exciting experience.

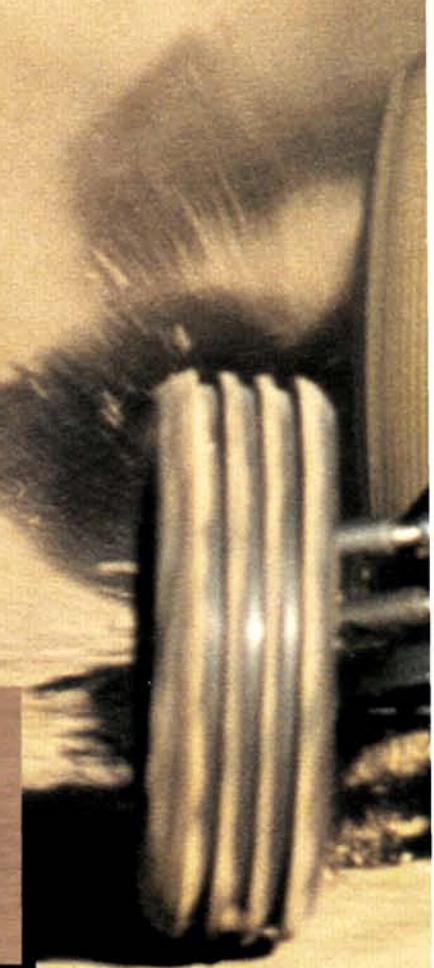
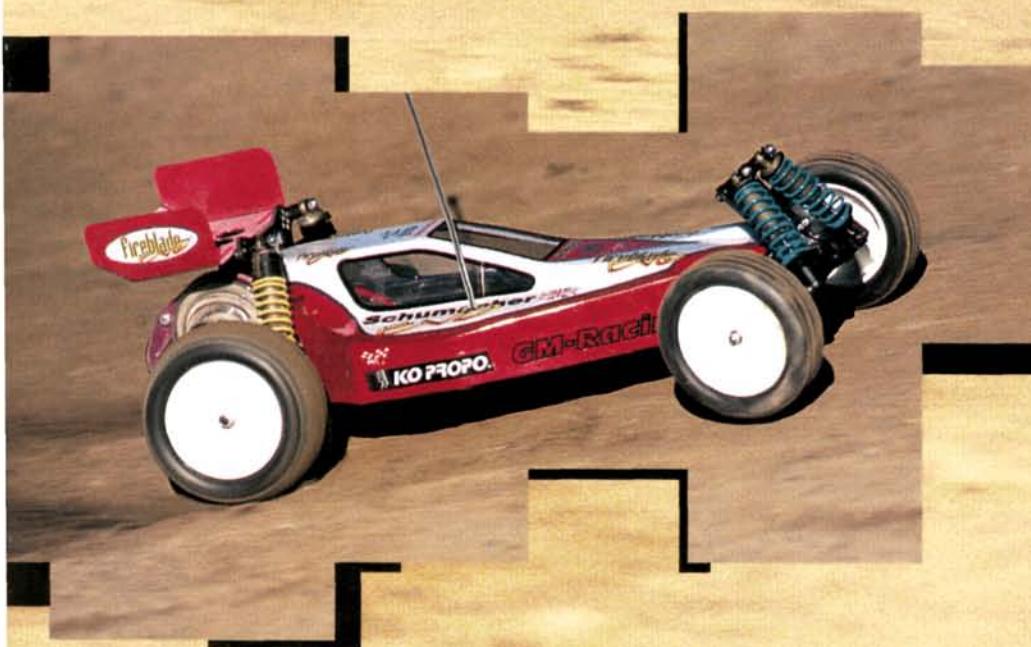
*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■

Schumacher Fireblade EVO

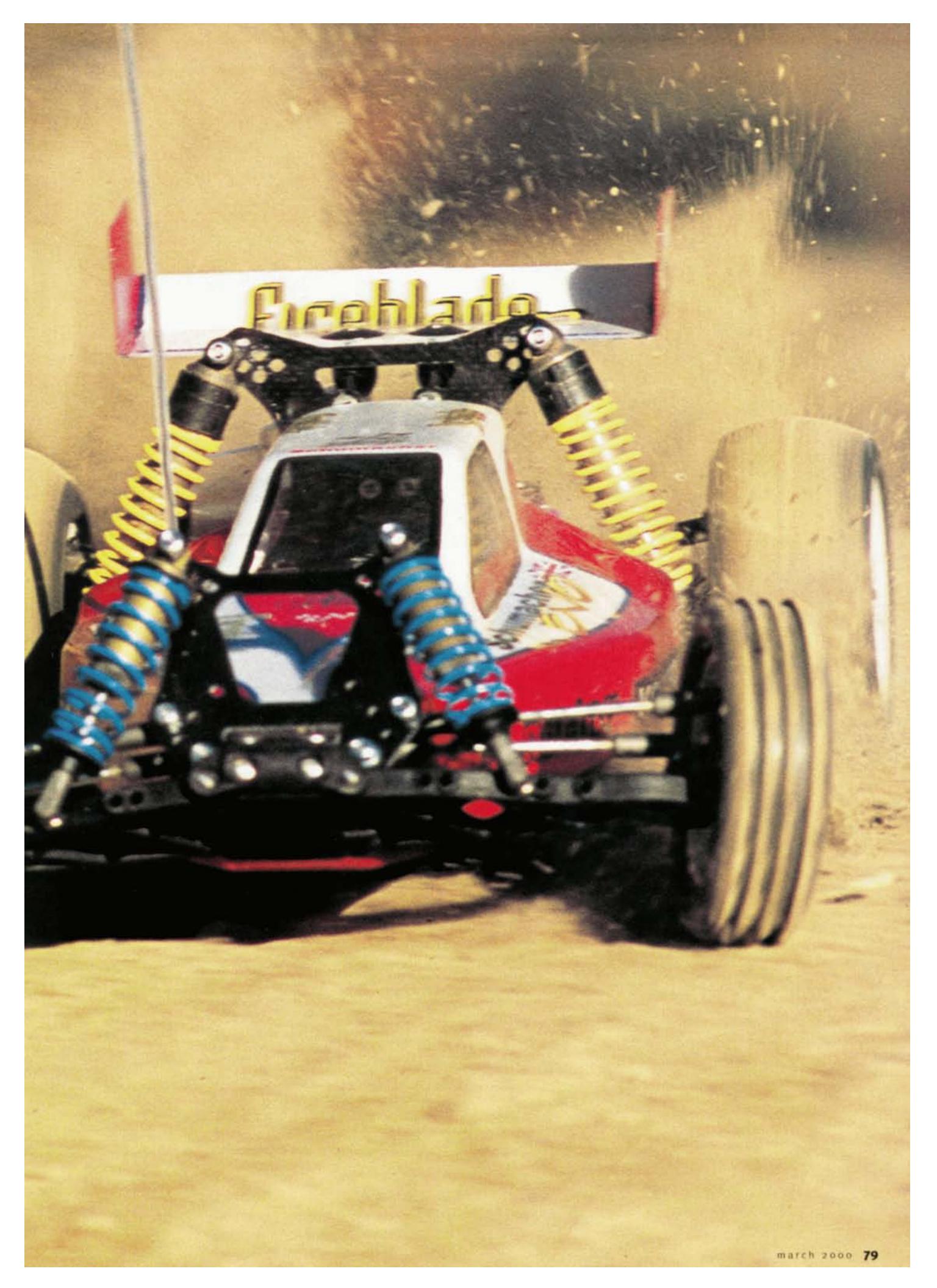
Schumacher's latest goes
more mainstream—
and goes faster

by Greg Vogel

Team Schumacher has always been a presence on the race scene, but they were particularly easy to spot at the 1999 IFMAR Off-Road Worlds. Factory driver Teemu Leino put Schumacher USA* in the spotlight as he TQ'd the warm-up race, then qualified eighth and finished 10th in the 2WD modified class with the new Fireblade EVO. So what has Schumacher done to its car to place it with the 10 fastest cars in the world? With a Fireblade USA in one hand and a caliper in the other, I'll explain the differences between the new EVO and its predecessor and detail the all-around changes that have made Schumacher's newest car a notable contender.



PHOTOS BY WALTER SIDAS



Fiechilado

TRACK TEST Schumacher EVO

DATA CENTER

Vehicle type: 1/10-scale, electric, 2WD, off-road, race buggy
Best buyer: racers looking for a competent buggy

KIT RATINGS (excellent, very good, good, satisfactory, poor)
Instructions: good
Parts fit/finish: satisfactory
Durability: good
Overall performance: very good



Left: new steering knuckles and long suspension arms grace the front end of the EVO and contribute to its improved performance.

Right: a new type of hub carrier offers more tuning options. MIP CVDs are stock equipment on the buggy, along with hard aluminum shock bodies.

SPECIFICATIONS

SCALE 1/10

DIMENSIONS (chassis only)

Wheelbase 10.313 in. (262mm)
Width (F/R) 9.27/9.35 in. (235/237mm)

WEIGHT

Gross, RTR 56 oz. (1,588g)

CHASSIS

Type Double-deck
Material Carbon composite

DRIVE TRAIN

Type Gearbox
Primary Pinion/spur
Transmission ratio 2.0
Differential(s) Ball
Bearings/bushings Bearings

SUSPENSION

Front Lower arm
Damping Aluminum body, oil-filled coil-over shocks
Camber links Adjustable
Tie rods Adjustable

WHEELS

Type White, 2.2-in. 3-spoke

TIRES

Type Mini spike

ELECTRICS (not included)

Motor GM 13x2
Battery GM VIS-EXTRA
ESC CS Electric Rocket 2000
Servo KO Propo PDS-2123 FET digital
Radio KO Propo Vantage

KIT FEATURES

• **CHASSIS.** As do all Schumacher racecars, the EVO features a "carbon-composite," double-deck chassis (the material feels like fiberglass, but it has the woven look of graphite). The lower plate has countersunk screw holes and slots that allow the batteries to sit as low as they can in the chassis. An opening in the upper deck allows you to install the battery in the center where it is secured by a molded strap and a body clip. Special cross-braced, plastic standoffs help support the upper deck and form an ultra-rigid chassis.

I was somewhat disappointed in the quality of the decks' finish. Sharp tabs ("pips," in Schumacher-speak) are left on the chassis parts after they are manufactured, and you have to take extra time to remove them with a file or Dremel tool. It would be nice if this were done at the factory.

On the plus side, the new chassis design has larger platforms for mounting your ESC and receiver. The Fireblade USA required the electronics to be mounted on the chassis standoffs, but the EVO has small "wings" to hold the receiver and ESC. Also, the steering

building tips

The EVO is not a beginner's kit; it should be built by a racer, or someone who has experience in building race kits. Here are a few tips to help with the building process.

TRANSMISSION

■ **Step 1.** When you open the kit, you'll notice that Schumacher has added the slipper assembly and shaft separately. Open the slipper bag first, and follow the instructions that come with the part. The instruction manual shows the installation of a non-slipper shaft that is also included with the kit.

■ **Step 5.** Don't forget the transmission spacer.

SHOCKS

■ **Step 6.** Use the included hard-

body aluminum shocks instead of the composite units.

CHASSIS

■ **Step 1.** File the battery slots so the cells sit as low as they can in the chassis, and use sandpaper to smooth the sharp edges of the chassis. Also file the tabs left on the chassis by the cutting machine.

■ **Step 3.** After you've mounted the servo on the posts, center the servo on the chassis before you tighten the screws and nuts.

■ **Step 9.** You may have to trim the ball cup that attaches the servo horn to the bellcrank. My KO Propo servo fit tightly, and the cup needed to be trimmed so it wouldn't rub against the servo's case.

servo is now mounted to the chassis horizontally instead of vertically. These new positions for the electronics help to lower the chassis' center of gravity.

• DRIVE TRAIN.

Many important components contribute to a smooth, long-lasting tranny, and Schumacher has covered all the bases. As far as the ball differential goes, I was pleased to see that it is still factory assembled. The really cool feature on the diff, though, is its dirt shields. Dirt and dust seem to find their way into even the most tightly sealed tranny, and then into the diff. The shields help prolong the diff's life.

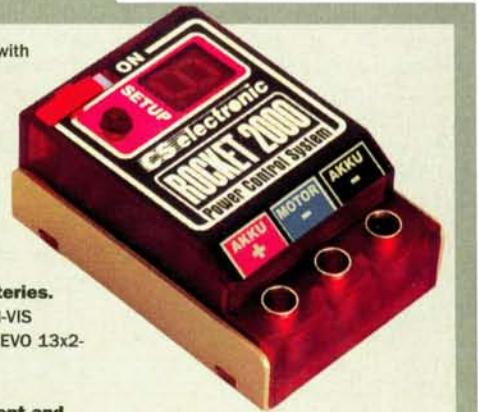
Schumacher supplies a slipper clutch and its required top shaft, as well as a "slipper-less" top shaft. Maybe slippers aren't necessary in Europe, but in the U.S., they are a welcome sight on any bumpy track; good job "slipping" both setups (lame pun, I know) into the kit, Schumacher! A purple-anodized motor plate adds a splash of color to the rear of the car, and ball bearings support all of the drive components.



The transmission is now a "stand-up" design, which allows the motor to be positioned closer to the rear wheels for increased traction. Schumacher's traditional O-ring wing retainers are present on the EVO; they allow the wing to give in a crash instead of bending or creasing.

YOU'LL NEED

- 2-channel radio system.
- Steering servo (high-speed preferred).
- ESC.
- Battery.
- Motor.
- Charger.
- Pinion gear.
- Polycarbonate-compatible paint.



leads, and it's packed with features such as single-button setup, active frequency control, auto-brake function, launch control and others that will help tune the ESC to the track.

■ **GM motor and batteries.** I used a 2000mAh GM-VIS matched pack and an EVO 13x2 turn motor.

■ **Pro-Line Ribbed front and Holeshot rear tires.** I swapped the stock tires and rims for Pro-Line rubber mounted on Schumacher's optional dish rims.

test gear

• **KO Propo Vantage stick radio.** Here's something you don't often see in the States; most U.S. drivers use pistol-grip radios. Why, you ask? I couldn't tell you; I just know that most European drivers use sticks. I've been practicing with this radio for a while, and although my skills are not perfect, I can maneuver the sticks pretty well and decided to give the Vantage a try in the EVO. The Vantage has the same options as KO's high-end wheel radio, the Mars, and that allowed me to dial in the car without any problem.

• **KO Propo digital FET servo.** KO's new metal-gear, digital FET servo also found its way into my buggy. I noticed that the servo is slightly larger than normal, but I was able to squeeze it into the car with only slight modifications. The servo has a blue pigtail for FET power, and its specs reveal why: 132 ounces of torque and a transit speed of 0.06 seconds at 7.2 volts; impressive.

• **The CS Rocket 2000 ESC.** This new, programmable ESC just became available, so I immediately mounted one on the EVO's chassis. The ESC measures a scant 40x28x18mm and weighs 20g. The 2000 features a digital readout display and removable

KO Propo Vantage Esprit-II



Stick radios are not popular among U.S. drivers, but in Europe, most RC car enthusiasts use model airplane-style sticks to pilot their vehicles. I wanted to try out sticks, but the lack of readily available, race-level computerized stick radios kept me committed to pistol systems—until the KO Propo Vantage came along, that is. This 4-channel stick radio has the same features as the Mars—KO's best wheel radio—so tuning the car was not a problem. The only thing I had to concentrate on was moving the sticks in the right directions.

The Vantage has a selectable-skill menu with levels ranging from 1 through 4. You can surf through these functions using the membrane keypads and digital display on the face of the radio. Level 1 can be considered a "beginner" level, as it allows you to access basic trim functions such as model name, servo-reversing, high point and balance adjustments. Level 2 gives you the ability to adjust curves, throttle speed and trim rate. Level 3 contains features such as steering speed, throttle preset, ABS braking and more. Level 4 has all of the functions of the other levels plus steering punch, throttle acceleration and throttle speed. Want more? The Vantage also features 3-channel capability (with an optional receiver), a supplied charging pack and a removable frequency module. Overall, I found the car easy to control with the Vantage radio, although off-road racing tends to be very forgiving and mistakes can be easily corrected. On-road, however, tends to be more demanding and requires skill with the sticks. If you'd like to give sticks a try without committing to a big-dollar radio, you can purchase a super-inexpensive, beginner AM system for about \$50; if you like the feel of a stick setup, I strongly recommend the KO Vantage.



Here's the frequency module removed from the bottom of the radio. KO Propo's optional 9.6V, 1100mAh power pack was installed as well.

hex plate is pressure-fit to the axle, and the rear wheels bolt to it. Maybe it's just me, but I'm not comfortable relying on the pressure of a nut to make the difference between running and sitting on the grid with an axle spinning in the wheel. Although Schumacher has used this system for several years, I'd still rather see a pinned axle.

The transmission's configuration has also changed. The motor has been moved forward so its weight is as close to the wheels as possible. This also improves the weight bias from front to back.

• **STEERING.** The EVO's bellcranks are tilted back to match the angle of the front kick-up, and this helps eliminate bump-steer. Two Ackerman links are provided, and a built-in servo-saver reduces the chance of damaging a servo. I installed a new KO Propo* digital servo in the buggy with some minor modifications to the ball cup that connects the servo-saver to the servo horn (for details, see "Building and setup tips").

• **SUSPENSION.** The EVO's suspension looks similar to that of its predecessor, the Fireblade USA; however, if you take a closer look, you'll notice some significant changes. For starters, the front suspension arms have two mounting positions for the shock. The length of the arms has also been increased approximately 2mm. The spindle support block is angled slightly toward the back. Up front, the steering spindle is slightly larger than it is on the older unit and now includes a second hole for the steering link. For more steering, the forward-most hole in the knuckle is recommended.

The rear arms are about as long as on the older version of the Fireblade, which had three shock-mounting locations; now there are four. Speaking of locations, the new rear hub carrier has three mounting positions for the upper link. The hub is still capable of being moved fore or aft to change the wheelbase. The inboard pivot can still be adjusted by switching the position of the block or exchanging it with the optional units that come with the kit. By manipulating these blocks, you can change toe and anti-squat.

• **BODY, WHEELS AND TIRES.** In the past, Schumacher's bodies have had a bubble cockpit and odd, cat's-eye-shaped side windows that weren't very attractive to many racers. I was pleasantly surprised to see the new body included with the EVO. It has more of a square, buggy shape, similar to the B3 and the Triple-X. A lower Lexan cover that keeps dirt out of the buggy has been retained.

The kit includes soft, small, pin-spiked tires for the front and

rear, with foam inserts and 3-spoke rims to mount them on. Unfortunately, there are very few tracks in this country where these tires will hook up well enough to be competitive. At the very least, a swap to ribbed front tires is required.

PERFORMANCE

Back in April 1999, the editors of *RC Car Action* spent several weeks testing three cars for the "2WD Competition Buggy Guide." The Fireblade USA was included in this test, and it found its way home with me. Following our original test, I spent several weeks tuning the USA and getting to know its pros and cons. With my knowledge of the USA, I was eager to find out if the changes Schumacher made were effective.

Before I hit the track, I mounted some Pro-Line Ribbed fronts and Holeshot rears on Schumacher's optional dish rims. I used 45WT oil up front and 40WT in the rear, with two-hole pistons in all four shocks.

I noticed that the old USA handled somewhat inconsistently in stock form, which led me to bolt on Associated front axles and Pro-Line wide front rims to help increase stability. The EVO's front is wider than its predecessors' in stock form, and the benefits show on the track. Over the rough, the car handled much better and was very smooth. Chassis roll seems just a hair less noticeable now that the electronics are laid flat on the chassis.

The EVO's rear suspension is also an improvement over the USA model's. Where I found the USA edition's rear traction to be inconsistent, the EVO was able to lay down more power and had better traction through the corners. I suspect this is because the motor is now positioned closer to the rear wheels.

As I mentioned earlier, I used Pro-Line tires; these meats worked well on the track. The EVO had plenty of steering, but it felt a little twitchy, perhaps due to the short throw the servo has to turn the bellcranks. Nevertheless, the car has a lot of steering.

WRAP UP

I believe Schumacher has made an excellent competition car that will do very well on bumpy, rough American tracks. The car needs very few hop-ups; in fact, all I plan to add is a set of titanium tie rods. Other than that, it's all about getting some track time and doing a little tuning. The end result will be an excellent racecar that you'll enjoy driving.

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■

Anderson Legend Elite

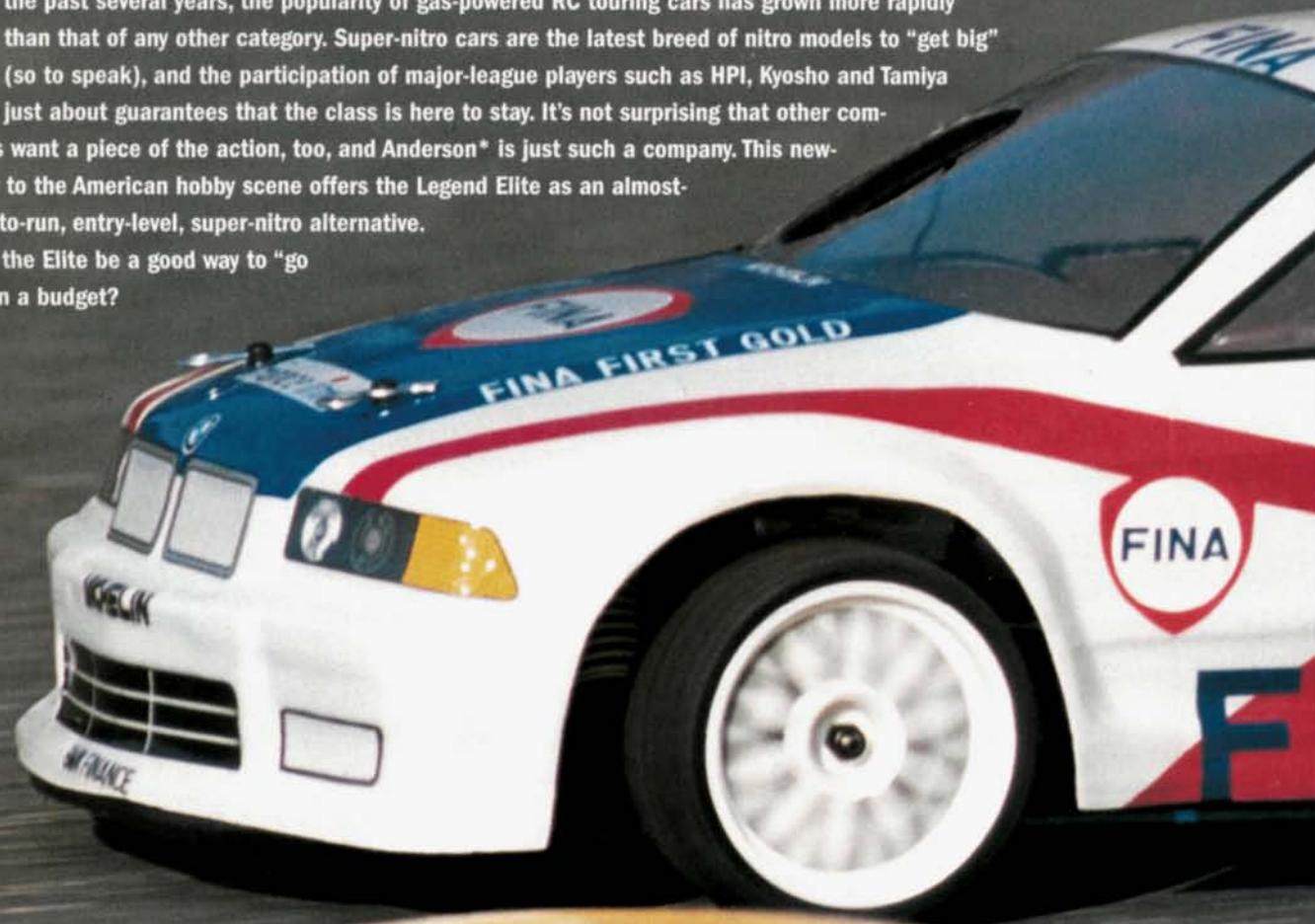
A super-scale alternative

by Doug Mertes

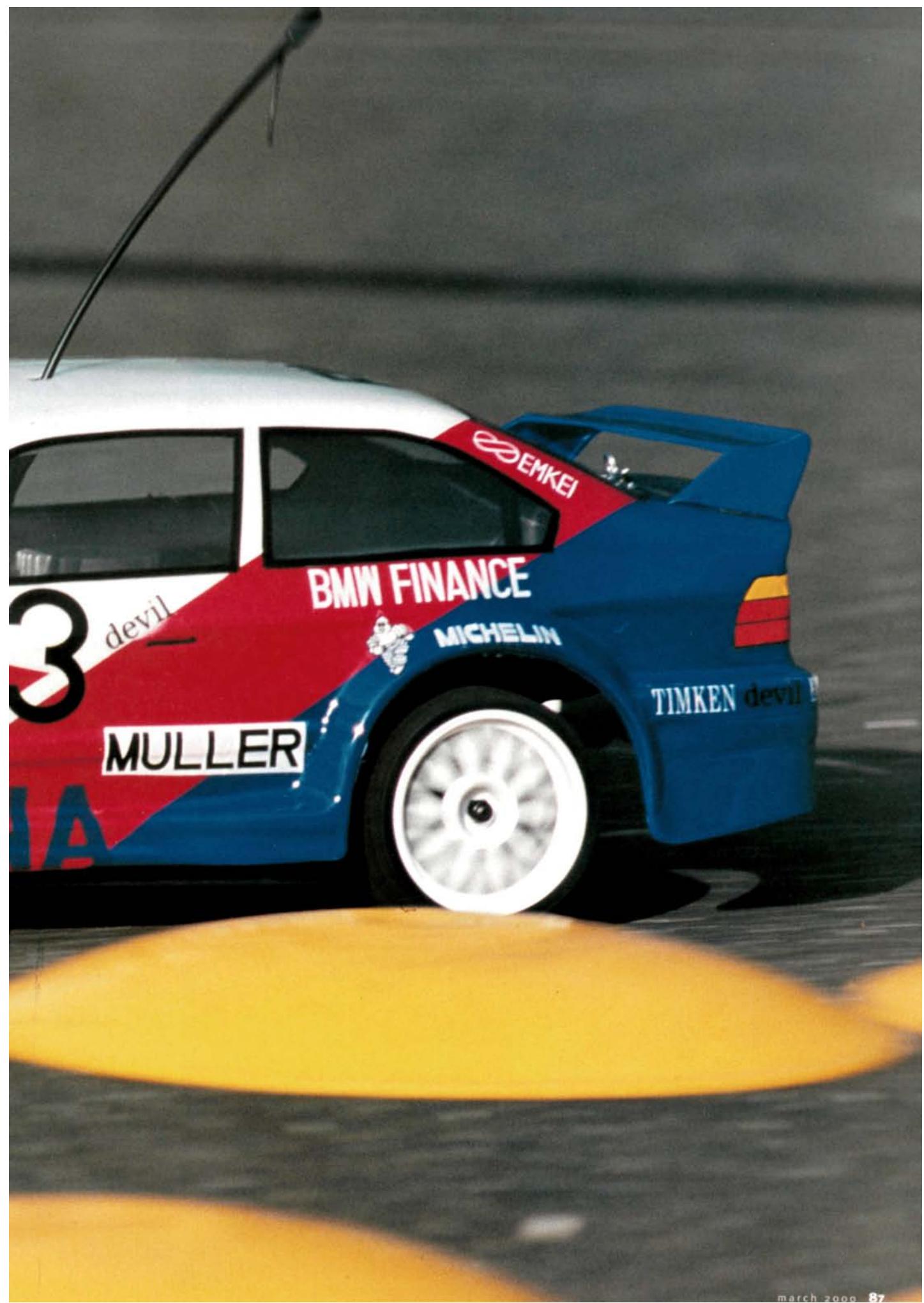
If you'd like an example of exponential growth, check out the nitro-powered sedan category. Over the past several years, the popularity of gas-powered RC touring cars has grown more rapidly than that of any other category. Super-nitro cars are the latest breed of nitro models to "get big" (so to speak), and the participation of major-league players such as HPI, Kyosho and Tamiya just about guarantees that the class is here to stay. It's not surprising that other companies want a piece of the action, too, and Anderson* is just such a company. This newcomer to the American hobby scene offers the Legend Elite as an almost-ready-to-run, entry-level, super-nitro alternative.

Could the Elite be a good way to "go

big" on a budget?



PHOTOS BY WALTER SIDAS



TRACK TEST Anderson Legend Elite



The fuel tank and engine are neatly placed on the chassis, but the pull-starter handle is left to flop against the right rear tire; that can't be good. A machined-aluminum heat-sink head would be more stylish than the cast unit, but the stocker is full of fins and works well.



DATA CENTER

Vehicle type: super-nitro, 4WD, .12-powered touring chassis
Best buyer: moderately experienced hobbyists who like to tinker

KIT RATINGS (poor, satisfactory, good, very good, excellent)
Instructions: satisfactory
Parts fit/finish: satisfactory
Durability: very good
Overall performance: good

LIKES

- Very forgiving handling; easy to drive.
- Very durable.

DISLIKES

- Difficult to find a body that fits the chassis properly.
- Steering linkages must be replaced from the get-go.
- Pull-starter handle is positioned close to hot manifold.

SPECIFICATIONS

SCALE $\frac{1}{10}$
LIST PRICE \$249

DIMENSIONS

Wheelbase 10.6 in. (269.2mm)
Width 9.8 in. (249mm)

WEIGHT

As tested 71.4 oz. (2,024g)

CHASSIS

Type Double-deck
Material 2.5mm aluminum lower plate, fiberglass upper deck

DRIVE TRAIN

Type Telescoping drive shaft
Primary Clutch bell/spur gear

Drive shafts Telescoping universal

Differential(s) Bevel gear

Clutch Centrifugal

Bearings Bearing-supported drive train, bushed wheels

SUSPENSION

Type (F/R) Upper and lower wishbone with pivot balls/lower wishbone with pivot balls, upper H-arm

Damping Aluminum oil-filled shocks

WHEELS

Type One-piece molded plastic, mesh pattern

TIRES

Type Street-tread-style with foam liners

ENGINE AND ACCESSORIES

Engine Anderson .12

Carburetor Slide

Starter Pull-start

Pipe Anderson aluminum tuned-type

Manifold Anderson bolt-on

Fuel (not included) Trinity Monster Horsepower

ELECTRONICS (NOT INCLUDED)

Transmitter Futaba*

Magnum Junior FM

Steering servo Futaba S9304

Throttle servo Futaba S148

Receiver pack 4 AA alkaline cells

A large front bumper offers ample protection, and adjustable body mounts ensure that the shell sits just right. Notice the upside-down front dampers.

KIT FEATURES

• **CHASSIS.** The Legend Elite's chassis design is conventional: a 2.5mm-thick, blue-anodized aluminum pan is joined to a two-piece fiberglass upper deck by a series of black nylon standoffs. Although not as glamorous as graphite, fiberglass is more than adequate in this application and results in a capable platform that's torsionally rigid. This chassis has no surprises; it does a good job of keeping all the various bits and pieces aligned and working cooperatively.

• **DRIVE TRAIN.** The gear differentials at each end of the car are joined by universal drive shafts connected to a common spur gear—a drive system similar to that used by Kyosho and Tamiya in their super-scale vehicles. A nice fiber brake disc is mounted just forward of the spur; metal calipers provide sufficient stopping power. A spacer that's installed between the disc brake and spur gear leaves enough room when removed to add a 2-speed tranny, available as an option. If you've been hesitant to dive into nitro because you're concerned about damaging a super-expensive gas car, the Legend Elite's robust construction may make it a good choice for you; in fact, plastic, slider-type, universal drive shafts at each corner and bushings all around signal the Legend Elite's true calling: it's the asphalt equivalent of a backyard basher.

• **SUSPENSION.** Here's where things get a little more sophisticated. Up front, nylon upper and lower wishbones are connected to the

composite bulkhead and shock tower with oversize, threaded hinge pins, and the molded steering knuckles are attached to the suspension arms with captured pivot balls. This design is typically used on more expensive touring cars because the upper arm is triangular and, therefore, stronger. If the caster settings weren't fixed, this design would be on a par with the most advanced gas- and electric-sedan suspensions. Large, threaded retainers cap each pivot; these can be adjusted minutely to eliminate slop from the suspension as it wears over time. The rear suspension is very similar, except that upper H-arms are used, and only the lower arm features pivot balls. The shocks are blue-anodized aluminum units with what feels like medium-rated springs at both ends, and they provide sufficient damping for the job at hand.

• **STEERING.** This is a fairly conventional, molded-plastic assembly carried on brass-bushed pins. It incorporates a built-in servo-saver, and that's good because things get very tight and extremely busy down where the front drive shaft passes under the linkage. The cross link is obviously nicely designed, as it reduces bump steer and results in equal steering travel at the servo. With the steering servo mounted nose down on the upper tray, it's a simple matter to connect it to the linkage with the short length of supplied wire. Once centered, the linkage is easy to adjust with a single setscrew. This setup isn't particularly advanced, but it definitely gets the job done.

• **ENGINE AND ACCESSORIES.** The included .12 engine has a slide carb with high- and low-end needle adjustments and a separate idle screw. It's a side-exhaust design and mates nicely with the red-painted manifold and tuned exhaust pipe that come in the box. A slot in the chassis is provided for a starter box, in case you decide to install a non-pull-start engine in the future. Unlike some other manufacturers, Anderson includes the manifold, header, silicone coupler and the fuel line, so I was surprised that no glow plug was installed in the head. I used a Dynamite/McCoy no. MC59 plug to fire this baby up, and it worked perfectly throughout the test.

building & setup tips

The Anderson Legend Elite is almost completely assembled at the factory. That's good news because the manual isn't detailed enough to guide you through the complete assembly. It's comprised mostly of exploded views with minimal text, not all of which is in English. Still, the Legend isn't that complex, and if you've had some experience with other RC cars, you should be able to set it up correctly without too much trouble.

■ I discovered that the front ball joints must be replaced before you run the car. The ball joints that come with the kit aren't the right size, and they pop off the pillow balls when the suspension is compressed. For a slop-free fit, I replaced them with Rocket City* no. 87 ball joints.

■ To adjust suspension droop, I installed a 3x15mm machine-head screw in the bottom side of each suspension arm. A hole is molded into the arms for this purpose, and the aluminum chassis has small tabs that act as down stops for the screws. This is a nice adjustment to have, especially on a car that has as much suspension down-travel as the Legend Elite.

■ Although I found a way to re-route it without damaging it, the radio antenna wire is dangerously close to the main spur gear. A severed antenna can lead to a runaway car, so be extra careful here!

YOU'LL NEED

- Nitro fuel (15 to 20 percent).
- Glow starter.
- Glow plug.
- Receiver battery.
- Anderson body.
- Polycarbonate-compatible paint.
- Tire glue.
- 2-channel transmitter and receiver.
- Steering servo (high-torque recommended) and throttle/brake servo.

FACTORY OPTIONS

- Porsche 911 GT2 body set—part no. 255615.
- Steel universal swing shaft—250472.
- Ball-bearing set—200688.

test gear

• **Futaba Magnum Junior FM transmitter and receiver.** The Magnum Junior has always been a fine radio for gas use because it allows the throttle endpoints to be dialed in. Now that it's offered in an FM model for just a few dollars more than the AM, it just might be the best choice for nitro modelers on a budget.

• **Futaba 9304 steering servo.** The Elite is larger and heavier than a 1/10-scale tourer, so I installed a stronger, faster servo. A standard, 40 oz-in. servo will work OK, but a stronger servo brings the car's handling to life.

• **Futaba S148 throttle/brake servo.** A standard servo is sufficient here, and who doesn't have an S148 lying around?

• **Trinity Monster Horsepower 20-percent nitro.** This was my first experience with Trinity fuel, and I had no fuel-related problems. A steady trickle of oil from the pipe and cool operating temperatures indicated that the Monster Horsepower juice has plenty of piston-protecting lube.



TRACK TEST Anderson Legend Elite

super-scale hoops from other manufacturers will fit. The wide rears and narrow fronts use narrow, lightweight foam inserts. I glued them to the wheels between the strengthening ribs instead of to the insides of the tires because the tires fit so tightly on the wheels, I was worried about aligning them properly. With their aggressive tread design and medium compound, these tires worked very well on the unswept and untreated parking lots I encountered during testing.

The kit does not include a body, and because the Legend Elite has a shorter wheelbase and is wider than most super-nitro tour-

ing cars, body selection is limited. Bodies intended for the Kyosho SuperTen and short-wheelbase version of the HPI Super Nitro RS4 are close, but the wheels will protrude from the wheel wells—not pretty. For the best fit, pick up the correct Anderson body when you buy the kit; BMW and Mercedes versions are offered.

PERFORMANCE

Since the Legend Elite is intended more for play than competition, I decided to test it in the wide-open space of a parking lot rather than the confines of a racetrack. Recently paved and curb-free, the church lot I chose was practically empty during the week. Armed with a fresh quart of Trinity's* Monster 20-percent-nitro fuel and a freshly charged glow-plug starter, I primed the carb, gave the starter cord a few tugs and got ... nothing—nary a pop or sputter. After checking the usual suspects (fuel flow, glow plug, glow starter), I carefully seated the low-end carb screw and then backed it out exactly three turns. I primed the carb again, and this time, the little .12 buzzed to life on the first tug of the pull cord. I ran four tanks of nitro through the engine while burbling around the parking lot before I began to lean out the mixture a little. By the sixth tank, the car was scooting smoothly from one end of the lot to the other. Time to get serious.

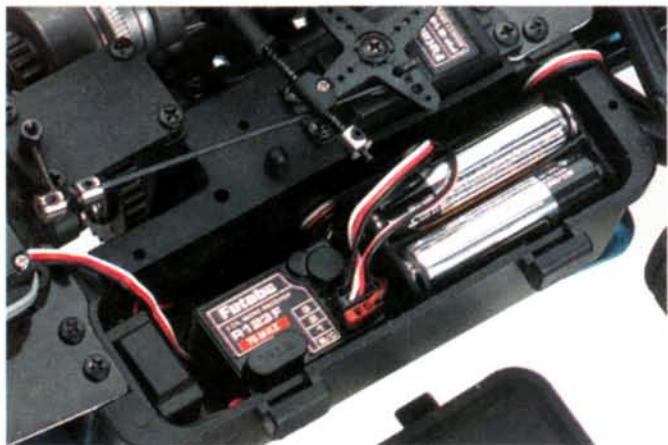
I drove the car very hard for the next half an hour and came away impressed. It's a stable handler, perhaps because it has a big, wide chassis with a "small chassis" engine on it. Even so, it doesn't have any bad habits that will require you to change your driving style. Out of the box, with 1 degree of camber at both ends, the Legend Elite has just a teeny bit of push—especially at low power. With more throttle, the back end will kick out at the apex and roll through the rest of the turn. The Anderson engine doesn't have the punch of a big-bore, .15 or .21 screamer, but it won't burn up a set of tires every couple of runs, either.

I spent some additional time working on suspension setups with my RPM camber gauge and eventually settled on 2 degrees rear camber and 1.5 up front. This gave the car a little more turn-in when it entered a 90-degree curve at high speed, but not so much that it spun out or misbehaved. Even when I chopped the throttle in the middle of a turn, the Anderson recovered nicely.

THE VERDICT

I must admit that when I first opened the box, I was more than a little skeptical about Anderson's Legend Elite. However, after several afternoons spent completing the kit and playing around on the asphalt, the Legend has won me over. It doesn't have the top speed of a full-on, $\frac{1}{10}$ -scale, competition nitro racer, but it isn't as touchy or as difficult to control at top speed as a narrow touring car, either. It's intended for all-around fun at a reasonable price, and I consider it good value for the money. For a while now, Anderson has been selling this car successfully in Europe, where super-nitro cars are very popular. I believe that, in time, they'll find the American run-for-fun contingent just as enthusiastic.

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■



The sealed radio box is a plus, particularly on a gas car. The Elite provides plenty of space for any receiver and receiver pack.

“...Progressive’s Piggyback Reservoirs are part of my winning package.”

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EDC-2 Shock Kits complete four position damping adjustable shocks including Piggyback Reservoirs. Suggested retail: 76.50 pr.

See table for applications.

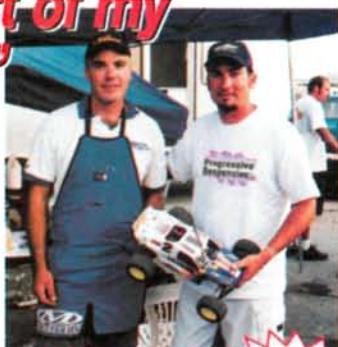
Piggyback Reservoir Kits

PBR-1001 Set of 2 SRP \$32.50
PBR-1002 Set of 4 SRP \$62.50

EDC-2 Piggyback Reservoir Shocks

EDC-2001	4"	Associated™	SRP \$76.50 pr.
EDC-2002	3.75"	Associated™	SRP \$76.50 pr.
EDC-2003	3.5"	Associated™	SRP \$76.50 pr.
EDC-2004	3"	Associated™	SRP \$76.50 pr.
EDC-2010	4"	Losi™	SRP \$76.50 pr.
EDC-2011	3.5"	Losi™	SRP \$76.50 pr.
EDC-2012	3"	Losi™	SRP \$76.50 pr.

Please indicate reservoir color choice when ordering.



Richard Saxton with mechanic Regan LeBlanc

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Kyosho TF-4 Type R

Fourth time's a charm

by Peter Vieira

You've got to give Kyosho's* designers credit for tenacity. Since it first hit the track as the TF-2, the Touring Force chassis has been constantly revised and refined by the slide-rule set in a nearly constant effort to improve the car. For the latest TF machine—the TF-4 Type R—Kyosho's engineers went beyond "revision" and aimed for "redesign." The number-four chassis is all new and offers an interesting mix of convenience features, performance-enhancing subtleties and high-quality materials. I feel confident saying that this is the best K-car to date even before I put down a lap, but I'll reserve judgment until it has been thoroughly wrung out. Who's with me?



TRACK TEST Kyosho TF-4 Type R



The molded layshaft supports are strengthened by aluminum side plates. Like many other tourers, the TF-4 holds the motor in a position that is somewhat inconvenient when soldering the ESC wires.



The supplied spur gear is "standard" 64 pitch. That's a Robinson pinion; the kit includes a lightweight aluminum pinion, but it left the car geared too high for the track I tested on. You can also see the molded transponder mount, which I melted with my soldering iron. Careless!

DATA CENTER

Vehicle type: competition electric 4WD touring car; chassis only.
Best buyer: experienced racer; enthusiast who wants a fully featured, high-performance car.

KIT RATINGS (poor, satisfactory, good, very good, excellent)
Instructions: very good
Parts fit and finish: very good
Durability: very good
Overall performance: very good

SPECIFICATIONS

SCALE $\frac{1}{10}$
LIST PRICE \$399

DIMENSIONS

Wheelbase 10.24 in.
(260mm)
Width 7.48 in. (190mm)

WEIGHT

Total, as tested
36.25 oz. (1,027.7g)

CHASSIS

Type Double-deck
Material Graphite plate
(2mm upper, 2.5mm lower)

DRIVE TRAIN

Type Dual belt
Primary 36-tooth pinion/120-tooth spur gear
Drive shafts Universal-joint, steel
Differentials Ball Bearings/bushings
Shielded ball bearings throughout

SUSPENSION

Type Lower A-arm with turnbuckle upper link
Damping Oil-filled aluminum shock

WHEELS AND TIRES

(not included)
TRC foam (Purple front, Pink rear)

ELECTRONICS

(not included)
Transmitter KO Propo EX-1 Mars
Receiver Novak XXL
Steering servo JR Racing Z550 Premium Race
ESC Novak Atom
Motor Reedy Rage Type R

LIKES

- Many new parts, all nicely molded; much less flashing than TF-3 series.
- Super secure cell-holding system (say that five times fast).
- Good out-of-the-box setup; easily tunable.
- At last: a Type R with adjustable belt tension!

DISLIKES

- Friction-fit drive hexes. I'd prefer to see pinned hex-hubs.
- Bearings for front belt tensioner not included.
- I can see not including a body, and, sure, I probably would junk kit tires, but no wheels?



KIT FEATURES

• **CHASSIS.** A double-deck graphite chassis certainly isn't unusual in the pro-car ranks, but the TF-4 platform has some interesting features. First, the bumper mount is a separate piece of graphite. That doesn't seem like a big deal, but you'll thank Kyosho when you find yourself replacing a \$5 bumper mount and installing it with a couple of screws instead of parting with \$50 for a chassis plate and spending a few hours rebuilding the car. Like the bumper, the steering servo also gets a separate graphite mounting tray, but for a different reason. According to Kyosho, the extra graphite typically required to form a mounting area for the servo on the right side of the chassis causes the chassis to have more torsional flex in one direction than another. The TF-4's design prevents this by bolting the servo tray to the center of the chassis. Washers between the tray and the chassis act as standoffs, allowing the chassis to flex equally in both directions.

The chassis is slotted to accept a saddle pack, but don't reach for a file to chamfer those slots; molded trays similar to those on the HPI RS4 Pro 2 are supplied to hold the cells. Molded straps that are

contoured to fit the cells are secured with body clips, and high walls on the battery trays all but guarantee that you'll never lose a pack in a crash. The kit also includes a well-designed stick-pack holder, and the instruction manual covers all the steps required to install either.

Other interesting chassis features include a molded transponder mount complete with a storage hole for the transponder clip, and a shock-absorbing, molded front bumper. The plastic bumper does the hard work of deflecting blows to the chassis, but Kyosho also supplies a shaped urethane bumper to help protect the body.

• **DRIVE TRAIN.** The TF-4 dual-belt drive train recycles Kyosho's dated but effective ball differentials, but everything between the diffs is new. Front and rear belt tension is now adjustable by selecting diff-mounting inserts that move the diffs slightly forward or backward in the bulkheads. A more conventional, top-deck-mounted tensioner is also provided to take slack out of the front belt, but Kyosho mysteriously decided not to include the bearings it requires—or bushings, for that matter. I'm glad the belt tension can be adjusted by repositioning the diff, but it's much easier to loosen a single screw and put a little pinch on the belt with a ball-bearing roller. I'll be picking up some bearings, thanks.

I built the dual ball-diff/front one-way belt pulley version of the TF-4; there's also a "B" version of the kit that includes a front one-way unit in place of the ball diff as well as the layshaft-mounted front one-way belt pulley. Both versions of the TF-4 also include fixed front belt pulleys. Since I prefer full-time 4WD, I installed the fixed setup.

The TF-4's spur gear mount is plastic, but it spins true. If the kit spur isn't to your liking, standard gears can be mounted. A lightweight aluminum pinion is included as well, and with 36 teeth, it's a big 'un. Combined

building & setup tips

■ **Steps 6, 7 and 8: layshaft installation and shock-tower assembly.** Don't forget to install the front belt before you assemble the layshaft bulkheads, and be sure to install the camber-link pivot balls on the same side of the shock towers as the heads of the shock-mounting screws. The TF-4's manual is perfectly clear on this, but I seem to goof up these steps whenever I build similar tourers. Make an effort not to get ahead of the manual, and you'll avoid repeating assembly steps.

■ **Step 10: differential assembly.** The supplied diff lube is fine, but the instructions call for plain grease to be used on the thrust bearing. Do yourself a favor and use black thrust-bearing grease instead; your diff will operate much more smoothly.

■ **Step 19: rear hub assembly.** There are two options here: you can install the pivot ball in the hub where the instructions suggest (and cut down the turnbuckles, which are about 1mm too long on each end), or you can just move the pivot ball to the fully outboard position. Since I had already assembled the camber links when I discovered that the minimum camber setting left me with positive camber, I took the easy way out and moved the ball.

■ **Step 24: steering knuckle assembly.** The knuckles and hub carriers are lefts and rights, so pay attention. I know you want to get the thing on the track, but if you take an extra five minutes, you'll save the 15 minutes of frustration it will require to redo a botched step. Breathe.

YOU'LL NEED

- 2-channel transmitter and receiver.
- Steering servo.
- Electronic speed control.
- Motor.
- Wheels suitable for Kyosho hubs.
- Tires.
- 190mm body.
- Polycarbonate-compatible paint.
- 6-cell saddle pack (preferred) or stick pack.
- Charger.

FACTORY OPTIONS

- Titanium screw set—part no. KYOC5454.
- Low-friction belt (F/R)—KYOC2293/KYOC2294.
- Special unicrank (steering bellcrank)—KYOC5826.
- On-road spring set—KYOC5856 (standard), KYOC4688 (soft).
- 3x6 flanged ball bearing (for bellcranks)—DTXC1505.
- 3x6 ball bearing (for belt tensioner)—DTXC1505.

test gear

• **KO Propo* EX-11 Mars transmitter.** Probably my favorite computer radio, the Mars has all the racing features I could ever want, most of which I don't touch, since I have the radio set for System Level 2. This "unlocks" the meat-and-potatoes features (subtrim, expo, dual rate) but locks out the nutty stuff (servo speed, ABS, turbo throttle, etc.).

• **Novak* XXL receiver.** I finally broke down and got an aftermarket receiver so my original equipment KO receiver can remain taped in my racetruck. The XXL has been great—no glitches.

• **Novak Atom ESC.** I was about to install the latest Cyclone with touring-car profiles, but the bellcranks must swing past the ESC, and the Cyclone was a tight fit. The Atom was handy, smaller and already had wires soldered in place from its last tour of duty. In it went, set with profile 1.

• **JR Racing* Z550 Premium Race steering servo.** Standard 40-ounce, 0.22-second servos can do the job in a touring car, but I wanted something a little faster and stronger so the TF-4 would perform its best. The Premium Race unit is quick (0.16 second transit time) and powerful (55 oz-in. of torque).

• **Reedy Zappers 2000 cells.** Matched Sanyos from multiple world champion battery and motor guy Mike Reedy? I guess they'll do.

• **Reedy Rage Type R stock motor.** In case you haven't heard, rebuildable motors rule, and the Reedy tear-down is a solid performer.

• **Andy's Stratus body.** What TC racer hasn't run this body at least once? Any 190mm body is a good match for the TF-4, but the Andy's Stratus is a proven winner.

• **TRC Touring Car foam tires.** I ran a set of Purple foams up front and Pinks in the rear. Quality foam



from TRC is nothing new, but the rims on which the tires are mounted are fresh molds. In addition to properly fitting Kyosho drive hexes (thank you), the rims include trick Lexan covers that give you the aerodynamics of a dish wheel without obscuring the sweet-looking 16-spoke hoop underneath.

TRACK TEST Kyosho TF-4 Type R

with the 120-tooth spur, 15-tooth pulleys and 32-tooth diffs, the TF-4 rolls onto the track with a stock-motor-ready final drive ratio of 7.1:1. The kit gears are so big they actually bottom out the motor in its adjustment slots; when using the included spur gear, you'll only be able to gear down, not up.

A complete set of universal-joint axles is the finishing touch for the drive train—and always a welcome sight. Less welcome are the friction-fit drive hexes. I'll admit these pieces seem to stay put better on the TF-4 than on the TF-3s I've built, but unless you use Kyosho-specific hoops, you can expect to have drive hexes stuck in your wheels sooner or later—probably sooner.

SUSPENSION

Kyosho relies on bread-and-butter concepts in the suspension department: lower A-arms and steel turnbuckle upper links do their thing capably and pivot on captured hinge pins in the bulkheads and E-clipped pins in the hubs. The front arms are capped to reduce flexing, and all four arms are molded of Kyosho's stiffest stuff.

The steering knuckles are familiar TF series pieces, but new, taller hub carriers permit the height of the axles relative to the suspension arms to be adjusted via spacers; according to Kyosho, the kit setting (axles in highest position) is for high-bite tracks; lowering the axles is for low-bite conditions and presumably generates more grip; I'll have to play with it at the track. In addition to steering-knuckle height, the hub carriers also provide the caster setting. The carriers are molded with 8 degrees of caster, which yields a total of 10 degrees when combined with the 2-degree kickup of the suspension arms. The bracket that holds the front ends of the arms' hinge pins can be flipped for a "flat," 0-degree kickup setting.

The rear hubs are new, very minimalist in design and feature a pair of camber-link mounting options. Interestingly, the new hubs are shared with the Kyosho Ultima ST competition truck examined elsewhere in this issue. The hubs are universal and have no built-in toe setting, which leaves toe position up to the suspension arms. Assembled as suggested by the manual, the rear end has 1 degree of toe-in; by flipping over the rear hinge-pin mount, the arms may be set with 1.6 degrees of toe.

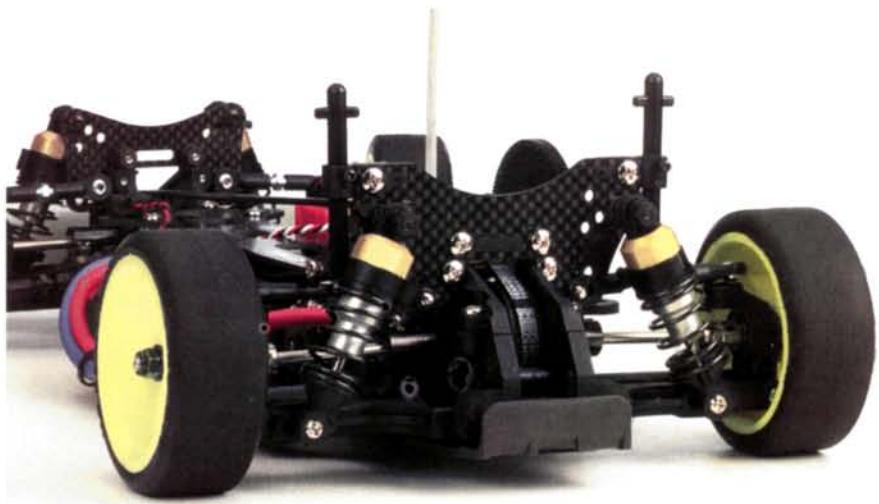
All the good stuff that hangs off the TF-4 chassis is useless if the shocks are subpar, but that's never a worry with Kyosho; the K-crew has always been known for top-drawer dampers. The aluminum units at each corner are easy to assemble despite their typically finicky wire seal retainers, and they are buttery smooth once assembled and filled. Kyosho includes a bottle of green shock fluid from its apparently bottomless well of outdated oil. I left the goop in the bottle and suggest you do the same, unless you have nothing else to pour into the shocks. I took a guess and filled the shocks with Team Losi* Certified 80WT fluid.

STEERING

A pair of bellcranks with a nonadjustable servo-saver swings the front wheels. The drag link between the bellcranks is made of flat aluminum stock and rides on bushings, and steel turnbuckles are included. The setup has more play than it should because the bellcranks rock slightly on their posts, but it has no more play than other competitive tourers.

BODY, WHEELS AND TIRES

Sorry; not included. It's unusual for a kit to include shock oil yet forgo something as basic as wheels, but I'll leave that paradox to



Although it looks very similar to the TF-3, the "4" model is all new. The rear mini-bumper diverts crash loads to the chassis and away from the toe-in bracket and suspension arms.

the Kyosho project managers. Be sure to pick up a set of wheels that are meant to fit—really fit—Kyosho hubs, and feel free to pick any 190mm body you like. I chose an Andy's* Stratus and TRC's* newest wheel and foam tire combos (which do fit Kyosho hexes properly). The kit's body posts are fully adjustable via screws instead of a body-clip shuffle, and the body is well supported, since the posts are on the front bumper and rear shock tower.

PERFORMANCE

There's no truer test of a racecar's capabilities than an actual race, so I packed up the TF-4 Type R and all my gear for a day of carpet-racing at RC Madness in scenic Enfield, CT. I prepped the car with a full coat of Paragon Ground Effects on the rear tires (TRC pinks, durometer 32), but painted only the inside halves of the front tires (TRC purples, durometer 44) with the compound.

The car felt terrible at first, and it hooked very badly. After a few laps, I knew it wasn't a handling issue; something was actually wrong with the car. Back in the pits, I discovered that one of the drive hexes had lost its grip on the axle, and that was causing the car to pull on the straights and unload the front diff in the turns. After tightening the axle nut with the extra leverage of a pair of pliers on the wrench, I returned to the track, and the TF-4 was transformed. Now it felt ready to race—lots of steering and just a little looseness in the rear to help the car carry speed through the corners. However, I found myself wishing for a bit more stability on the track's long back straight, so I inverted the TF-4's rear hinge-pin mount to access its 2-degree rear-toe-in setting. With that, the car felt dialed.

Mechanically, the TF-4 was very reliable, and the onboard transponder mount was very handy (although I was bummed when I carelessly melted a divot out of it while soldering my pack). I was very happy to get through a full day of racing without a single belt skip (the TF-3 was notorious for its slipping front belt). The TF-4 had no such problems, but its belt tension can be adjusted if and when stretch-related skipping occurs.

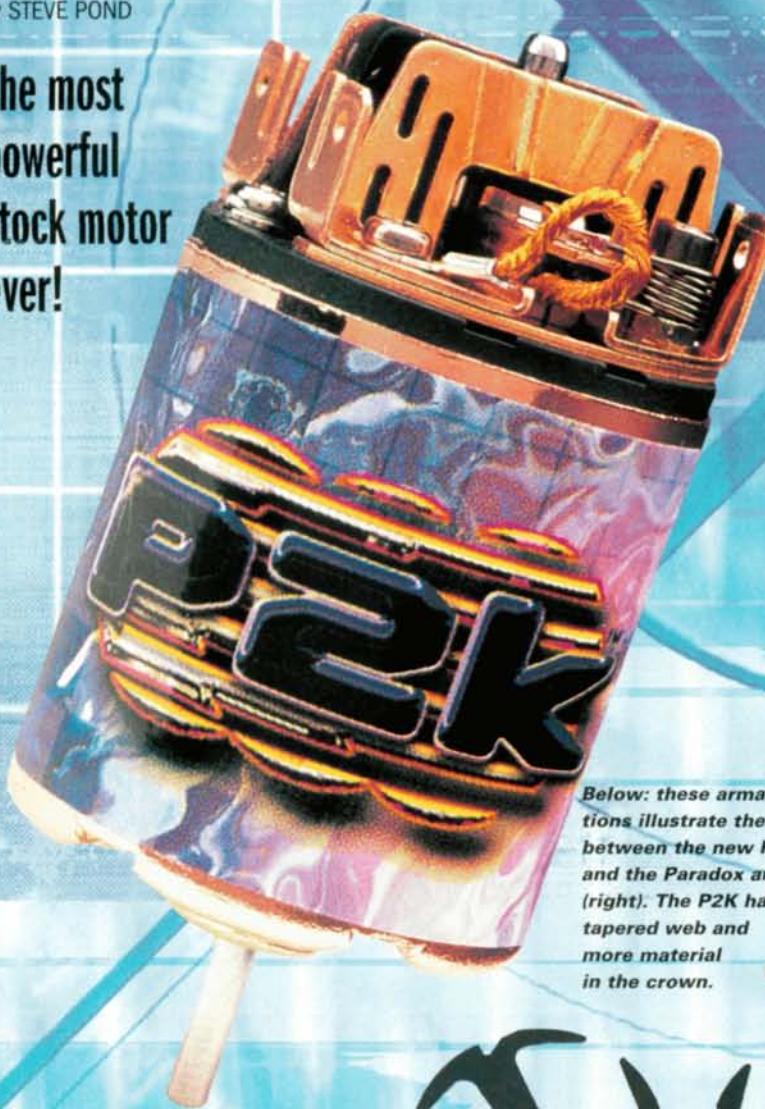
Overall, I had a good day at the races and my best laps were on an A-main pace (although I didn't make the A, thanks to some bad driving in the qualifiers. Who else can I blame?).

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■

Trinity P2K

by STEVE POND

The most powerful stock motor ever!



Below: these armature laminations illustrate the difference between the new P2K (left) and the Paradox armatures (right). The P2K has a tapered web and more material in the crown.



Above: the fully assembled armature is an integral part of the new motor design. Note the amount of material left in the crown for extra torque output. The P2K armatures have red tags so race inspectors can distinguish them from Paradox armatures.

TESTING

I admit I was skeptical as to whether or not the P2K would show any significant performance improvement over the Paradox. I think there's a limit to how much performance can be expected from a motor without reducing its number of windings. Sure, the P2K has a new armature, copper hardware and a change in its can's design, but how much power does that equal?

Trinity sent me a handful of extra sample motors from those earmarked for submission to various race-sanctioning organizations. They were the standard-version P2K instead of the upcoming "Pro" model, which will include a precision-cut commutator and brushes of a higher grade. The standard motor is ideal for testing, however, as it allows me to establish a performance baseline.

I gave each motor a proper break-in, strapped each to my Robitronic* Pro-Master dyno and tested each at least five times. Their average power output ranged from 127 to 129 watts. Efficiency fell into the 73 to 76 percent range, and torque output ranged from 98 to 101 Nmm. These are the most impressive numbers I've seen from an out-of-the-box motor, but they aren't quite as good as the 131 watts of power and 100.2 Nmm of torque from the best-ever test of a Paradox. I hadn't yet, however, given the P2K the "Pro" treatment: a precision cut of the comm, a premium set of brushes and a change in spring tension.

I tried every brush-and-spring combination available from Trinity and settled on no. 4499 brushes with green springs on both sides of the endbell. This duo generated the best numbers I've

It has been a little more than a year since the introduction of Trinity's* Paradox stock motor. First seen at the 1998 Chicago Model Hobby Show, the Paradox pioneered the rebuildable stock motor concept. The Paradox, though still a very versatile stock motor, is almost identical to the Midnight 2; the only difference is the removable endbell.

The Midnight 2 and the Paradox had a performance advantage over their competitors' aging designs, but the introduction of new motors by Yokomo* and GM* reduced their advantage and perhaps eliminated it altogether. Many stock motor gurus thought these motors were fast reaching the edge of their performance envelopes; after all, there is a limit to how much power a motor can produce within the confines established by race-sanctioning organizations, right? Well, it appears Trinity is trying to pull away from the competition with a new stock powerplant for the new century. During the past year, Trinity has shifted its focus from simply making a rebuildable motor to producing one with enhanced power. The result is the new P2K Copper Head.

MOTOR CAN

The P2K's motor can is formed out of 1.4mm copper-plated steel. Its bottom vents look like those of the Paradox, but there are now new, indented side vents, which are designed to enhance performance. The indents are punched at an angle, facing the direction of armature rotation. Also, the offset vents are punched through the shallow side of the indents. This combination is said to alter the magnetic field to provide more effective timing within the mechanical timing limits established by race-sanctioning organizations. Trinity explains this will slightly affect efficiency, and that's why you won't see these features on Trinity's new mod motors. In stock racing, however, where run times are much less of an issue, the performance gains supposedly outweigh the minor loss of efficiency.

Last, the can has bright copper plating to match the endbell's copper components.

The metal hardware on the endbell is copper, giving the P2K its *Copper Head* designation. This is used instead of the more common anodized-aluminum, which doesn't conduct electricity as well. The pure copper parts are plated with a corrosion-resistant copper composite so they won't tarnish.



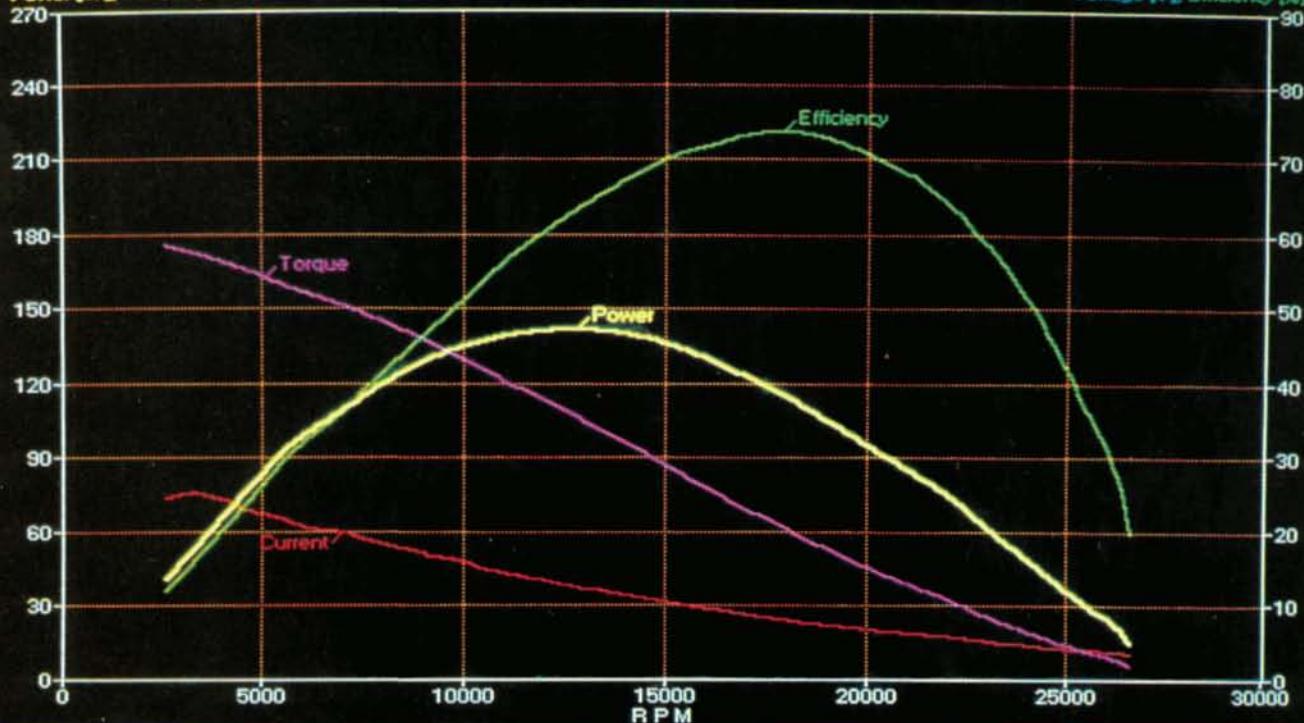
Robitronic

PRO-Master Motor Check

Version 2.4

Power [W], Torque [Nmm], Current [A]

Voltage [V], Efficiency [%]



	RPM	Power	Torque	Efficiency	Current	Voltage	Time	
MaxPower	12,806	141.9W	106.2 Nmm	63.5 %	37.0A	6.0V	0.44 s	Motor 1: Simulation: 7.5 Volt
MaxEff	17,892	115.8W	61.9 Nmm	73.8 %	24.4A	6.4V	0.77 s	Torque: 197.7 Nmm
MaxRpm	26,764	10.0W	3.6 Nmm	14.4 %	9.8A	7.1V	4.18 s	EMF: 181.8 mV/kRpm
Average 30-35A		91.3W		47.9 %				Friction: 12.92 Nmm
		137.8W		68.8 %				Trinity 27:1 P2K

MotorCheck <File> <ShowData> <View Axis> <Print Data> <Setup> <Utility> <Exit>

ever seen from a stock motor—period. The information shown on the dyno screen is typical of the P2K's best: almost 142 watts of power output, more than 106 Nmm of torque, roughly 74 percent efficiency and a spin-up time of 0.44 second. The P2K's rpm even exceeded the Paradox's rpm.

What's interesting about the P2K is that, although it can rev higher than the Paradox, it works better when loaded down a little more. According to the dyno readings, the motor should be run with a pinion gear that is one or two teeth larger than that used on a Paradox. It seemed rather peculiar, but track testing proved it.

I headed down to the local track at Xtreme R/C in New Milford, CT. A couple of the regular stock-class truck racers,

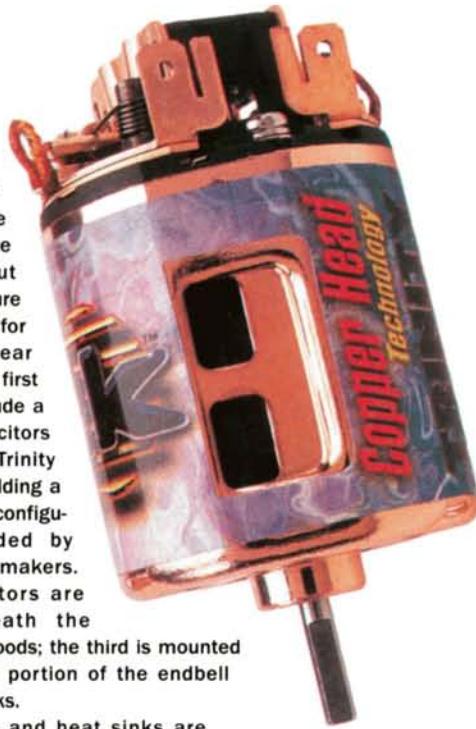
Dominic Cavoto and Mike Nash, were putting in some practice laps, so I asked them whether they'd mind strapping in a P2K for a few test runs. Mike was running a Paradox and Dominic was running a Yokomo-based Orion. We geared Mike's T3 with a 22/87 combination and Dominic's Double-XT 'CR' with a 22/84 pinion/spur combo. Both drivers concluded that the P2K, even with an aggressive final drive ratio (in the 9.5:1 range), gave them more punch than they've ever had. Mike pointed out that his truck, which had never before cleared the track's triples, was now clearing them with room to spare. Track testing isn't as scientific as dyno testing, but it helped me to see the dyno information converted into track performance results.

ENDBELL

The endbell is the P2K's most feature-packed component. Its molded composite backbone looks like that of the original Paradox, but one new feature is sure to set the standard for all motors in the near future. Orion was the first manufacturer to include a pair of built-in capacitors in the endbell, but Trinity upped the ante by adding a third capacitor—the configuration recommended by most speed-control makers. Two of the capacitors are mounted underneath the edges of the brush hoods; the third is mounted through the molded portion of the endbell between the heat sinks.

The brush hoods and heat sinks are what give the P2K the "Copper Head" designation. Both are made of copper, which is a superior electrical conductor. Most other motors have anodized-aluminum heat sinks. Aluminum is a very good thermal conductor, which makes sense for a heat-sink application. The downside to using aluminum is that it doesn't efficiently transfer current to the brushes. Trinity insisted that copper be used for both the brush-hood and the heat-sink sections of the endbell to maximize current flow through the brushes. Raw copper is apt to tarnish pretty quickly, so each of these components is plated with a copper composite to prevent this from happening. The copper plating retains the conductivity that would be compromised if another type of material were used for plating.

The only element of the endbell I would change is the brush-spring setup. Unlike those on most motors, both of the P2K's spring posts are

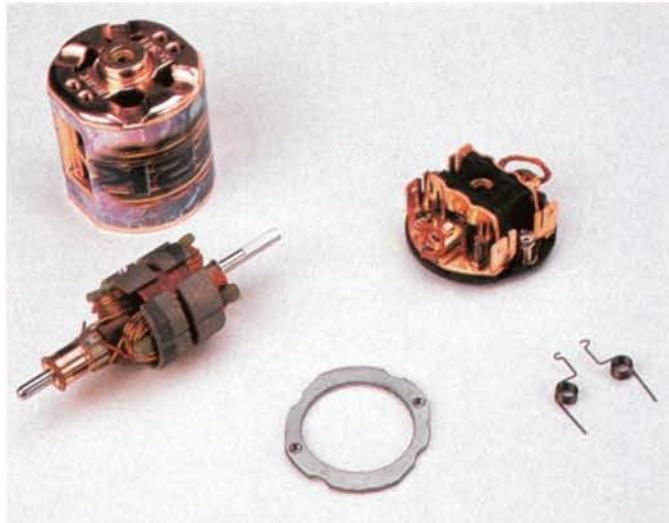


The new indented vents are configured to provide more effective timing. Note the indent is punched at an angle and facing toward the direction of armature rotation. The vents are large enough to permit visual inspection.

mounted on one side of the endbell instead of opposite each other. This requires the use of unique brush springs, so those who have amassed a pile of conventional springs over the years won't be able to use them. It isn't a big thing, and brush springs certainly aren't that expensive, but if I could build the perfect motor

ARMATURE

Leaving no stone unturned, Trinity gave the P2K an all-new armature. It features a twin-rotor design similar to that of the original Paradox, but the shape of its laminations has changed. The crown in each pole has less material removed than the Paradox armature. The result is improved torque compared with the previous design. However, some material has been removed from the crown to alter magnetic-flux path and increase effective timing and rpm. At the top of the armature is a 0.300-inch diameter commutator that is indexed to the stacks to prevent cheaters from "cranking" the armature to further increase timing. Running through the center of the commutator and the stacked rotor laminations is a 0.125-inch shaft. The armature shaft is tapered on the commutator end and protrudes from the endbell—features that allow



The P2K features virtually all new components, including the can, endbell and armature.

the armature to be easily and quickly identified as stock-class-legal.

The final security measure is a red tag on the P2K armature; the Paradox tag is white. The red tag is necessary to distinguish the P2K armature from that used in the original Paradox because the rules don't allow the use of any armature other than the type originally included with the motor.

CONCLUSION

The P2K is, without question, the most powerful stock motor I've ever tested, and not by a small margin either—at least, not in racing terms. Power output jumps more than 8 percent over the best readings I've ever seen. For that matter, all of the P2K's other important figures (with the exception of efficiency) eclipse those of any other motor I've tested.

Average enthusiasts won't be pulling away from their friends' cars at a breakneck speed in the local parking lot, but experienced racers with proper driving and motor-tuning skills will certainly see a difference.

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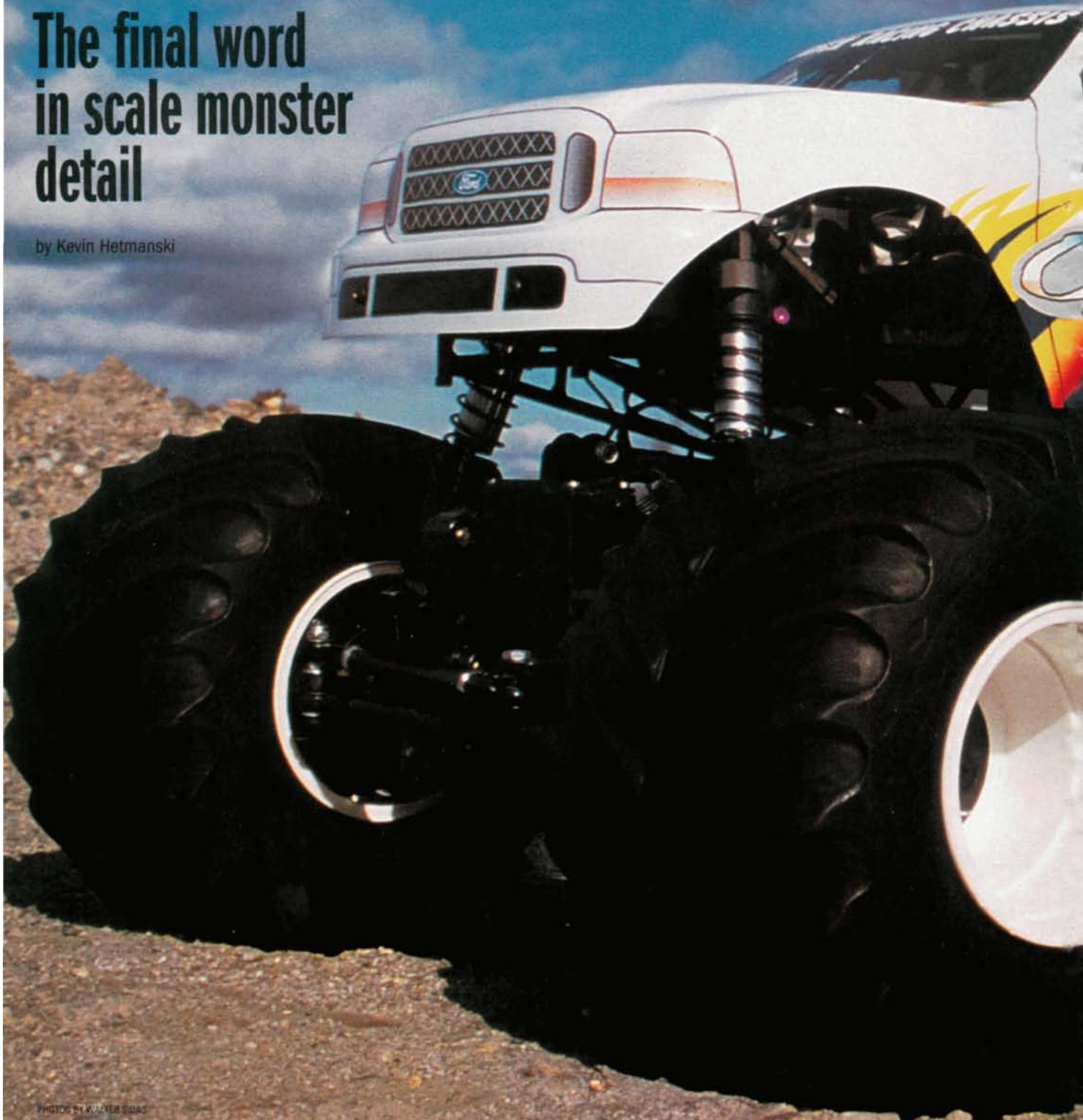


With the brush hood and endbell heat sink removed, the built-in capacitors are visible. On the other side of the motor, another capacitor under the heat sink brings the total to three, which satisfies the requirements of most major ESC manufacturers. Adding the third capacitor makes installing the P2K a solderless operation for hobbyists who use press-on motor leads.

HOME BUILT

The final word in scale monster detail

by Kevin Hetmanski



PHOTOS BY WALTER SUDAS

EXTREME



David Pack of Richmond, VA, has been involved in RC for more than 13 years, and he currently has 10 plus RC cars and trucks in his fleet; all of them have been customized in some way. Dave also enjoys building small-scale plastic models and has combined his RC- and static-model building skills to construct the fantastic creation shown on these pages. I know what you're saying: "OK; another tube-frame, homebuilt monster truck." Believe me when I tell you that this is no ordinary homebuilt, tube-frame job.

Dave is a crew member for the full-size Extreme Overkill monster truck, so you know he has the skills and the inside knowledge to build the ultimate RC monster. Even if you aren't a monster-truck fan (what are you, crazy?), you will be impressed by this rig; trust me.

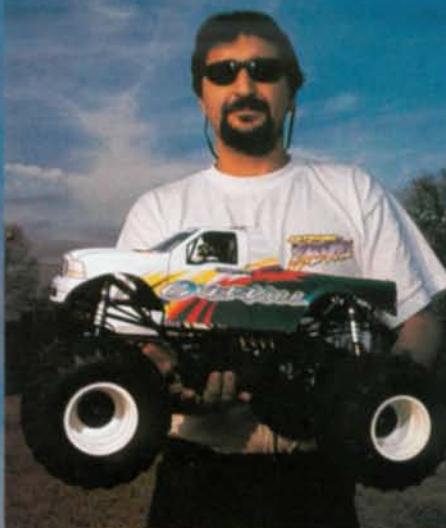


PHOTO BY WALTER S. DIAZ

OVERKILL



Length 17 in. (432mm)

Width 15.5 in. (394mm)

Wheelbase 13 in. (330mm)

Suspension travel 1.25 in. (32mm)

Motors (2) Trinity 17-turn Sapphire

Radio JR Alpina PCM

Servo Futaba 9301

ESC Tekin 420G2

Batteries Sanyo 1700

Chassis material Brass tube

Time to build Approximately 9 months, including research and development.

Total value About \$1,500 for all materials, plus my time, for a total of about \$3,000.

Most difficult step The suspension; it took a lot of cutting and moving to get it just right.

Next project I am going to build a scale replica of Dennis Anderson's Grave Digger. It will have doors that open, a removable front nose and a tube-frame chassis, just to name a few details.

• **Chassis.** Dave drew the chassis design on a sheet of paper and used it as a template to cut, bend and solder together brass tubes. The chassis is made from a combination of $\frac{1}{8}$ - and $\frac{3}{32}$ -inch diameter tubes; a K&S* tube bender was used to bend them cleanly, and silver solder was used to join them. When the chassis was completed, Dave cleaned up all the solder joints with medium-grit sandpaper. This resulted in a "seamless" look after the chassis had been primed and painted with Krylon enamel.

• **Suspension.** Dave made the four-link suspension arms out of thick piano wire with an 8-32 thread at each end and used Rocket City* heavy-duty ball ends to attach the custom-made links to the gearboxes and chassis.



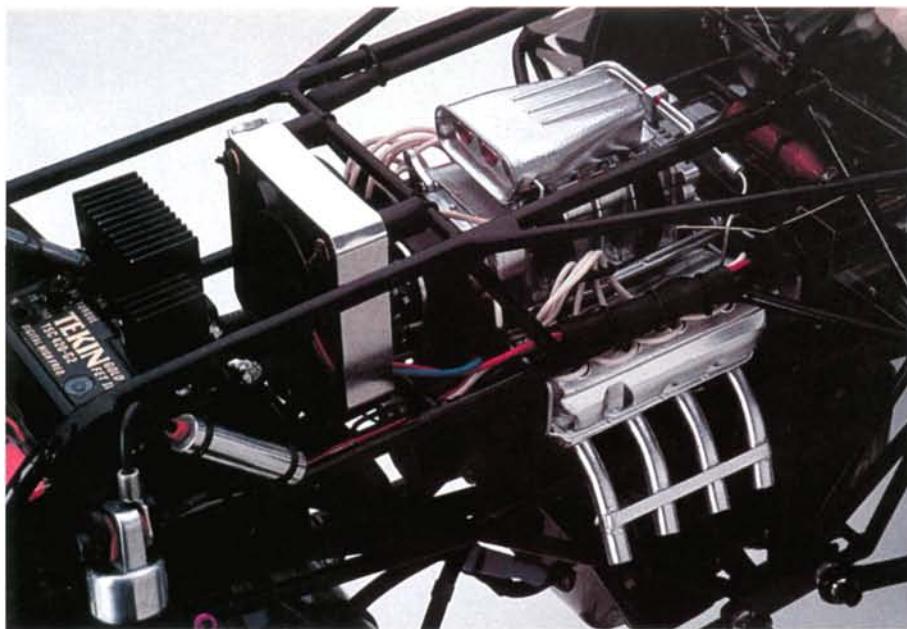
Just like the real monsters, Dave's truck has three batteries in the rear. Check out the tiny "charging jacks" in between the frame rails.



This driver has all the comforts of home. He started out as a James Bond action figure, then was cut in half and shortened to give him more realistic proportions.

sis. Instead of painting them, he covered the links with black shrink-wrap. Dave installed custom mounts on the gearboxes to attach the two top four-link bars.

Stripped and polished Losi* shocks were mounted on a slight angle to suspend the truck—a setup that allowed Dave to eliminate swaybars. The shocks are set up using Losi blue pistons, 15WT oil and Losi gray springs, and dummy reservoirs made of $\frac{1}{4}$ -inch aluminum round stock were added for a scale look. As a finishing touch, the shocks' gray springs were dyed (yes, dyed) black for a more realistic look.



Looking at the picture, it's really hard to tell whether the Parma engine sitting in the frame rails is real or fake. Just like the rest of the truck, Dave modified it to make it look as realistic as possible. The butterflies on the scoop open when the gas pedal is pressed down! This guy is nuts!

• **Body.** Parma's* Super Duty Ford body was used to top off the truck, along with a handmade racer-back spoiler for the back of the cab. Dave painted the body with Pactra* Racing Finish paint to match the full-size truck, and the decals were made by the same company as created the graphics for the full-scale Extreme Overkill. Instead of using body clips, Dave anchored the body to the chassis with 4-40-size button-head screws.

• **Tires and rims.** Believe it or not, these tires started out as stock Clod Buster meats. Dave actually sat down and shaved each tread with a rotary grinder—the same process full-scale, monster-truck crews use to modify race tires. Each tire took more than an hour to shave, but all that hard work paid off; these tires look sweet. Foam inserts were used to keep them from collapsing. Dummy "planetaries" were made out of Kydex and attached to the rims with screws, and spacers were added to the inside of the rims to make the truck ½ inch wider than stock.

• **Other details.** There are too many to list, so I'll just hit the highlights. The fuel cell that sits in the front of the truck was constructed of Evergreen styrene plastic; it hides the receiver. The straps on the fuel cell are made of the same material, and the cap is cut from a wooden dowel. It even has a working handle! The driver's compartment has Lexan covers to simulate the shields on real trucks. These are secured with zip-ties on the full-size truck, but no one makes zip-ties small enough to look scale, so Dave attached the shields with thin, black wire. The seat is from Parma's Small Block Chevy kit and has been highly

modified to look more realistic—right down to a five-point seatbelt harness made out of a shoelace. The gauges are pieces of wooden dowel, and Evergreen plastic tubing was used to make the rings that encircle the gauges. The gauge faces were cut from a photo in a Jegs racing-equipment catalog, then glued into place. Not scale enough for you yet? There's more. The tachometer has a working LED to simulate a shift light. The switches on the dashboard are fully functional; they control the radio LED, the shift light on the tach and



The shocks are old Losi units with the anodizing stripped off. They've been polished to a mirror-like shine.

the electric fan that's used to cool the ESC. A shift lever that actually moves back and forth is near the driver's seat. The pedals are also functional; the gas pedal is connected to the engine behind the driver's compartment, and when it's depressed, the butterflies on the injector open! The steering wheel was 'jacked out of a Barbie Corvette (a tearful Barbie was consoled by Ken, who assured her that he would track down the thief. So Dave, if some guy with molded plastic hair and a pastel suit corners you—that's Ken). As have many other



That fuel cell looks so real, you'll want to fill it up with racing fuel! To permit easy access to the crystal, the receiver is mounted upside-down in the cell. Check out the clear plastic shields held in place by small pieces of wire. If you look closely, you'll see that the body mounts are removable so that mounts to fit other bodies can be attached.

GETTING REAL WITH KIRK DABNEY



The homebuilt truck featured on these pages was inspired by Kirk Dabney's full-size Extreme Overkill monster truck. Kirk travels around the country and puts on shows for millions of fans. His full-size monster truck is truly impressive! The chassis is made of 2-inch seamless tubes—the same material

as is used to build stock-car frames. The chassis was designed by Dan Patrick, and it took five guys working 15 hours a day for 11 weeks to build it. The powerplant is a 572ci Ford SVO aluminum racing engine that puts out 1,500hp. Two Rockwell 106 planetary axles transfer the power to the huge Goodyear 66x43-inch monster-truck tires. This truck has more than 25 inches of suspension travel to soak up more than 9,000 pounds of weight coming off a jump. If you are thinking about building a real monster truck, think again; it costs about \$100,000 to build one from the ground up!

I recently interviewed Kirk Dabney about the Extreme Overkill and the RC connection; here's what he had to say.

RCCA: Radio Control Car Action: What is the most difficult thing about driving a monster truck?

Kirk Dabney: The hardest thing about driving a monster truck is being confident enough to use all its capabilities. Getting your confidence up has a lot to do with being a good driver.

RCCA: What's it like to be behind the wheel?

KD: There are moments when time seems to stand still—especially when you are involved in a crash. Tension and nerves are a big part of it. When I race my monster truck, I try to imagine

that I'm out in a field, driving around with my buddies.

RCCA: How much does it cost to get started in monster-truck racing?

KD: It would be hard to give an exact figure. There are many levels. Between twenty and thirty thousand dollars would get you an older-style truck with an older rig. Trucks are divided into local, regional and national divisions. National division trucks can have an unlimited value—some are worth up to half a million dollars. A local division truck could cost as little as ten thousand dollars.

RCCA: How long have you been involved in monster-truck racing?

KD: Since 1984. My truck was only the fifth one ever built.

RCCA: How many trucks do you own?

KD: Only two; the team is currently working on a development truck, and we might build a second one. I also own lots of custom street machines.

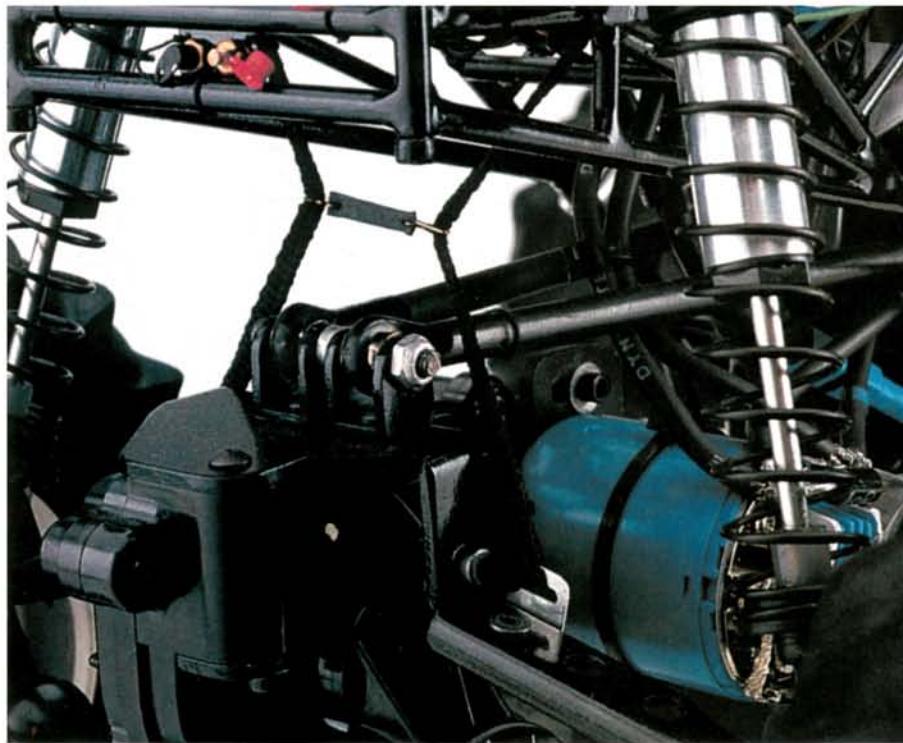
RCCA: What do you think of the RC version of your Overkill truck?

KD: I think it's awesome. It's the best RC monster truck I've ever seen; Dave Pack is one of a kind. He and I have always had a mutual interest in RC monster trucks.

RCCA: Do you own any RC vehicles?

KD: Yes; I own a Kyosho Nitro USA-1 that Dave Pack rebuilt and modified for me. It has an Overkill body, and it's all tricked out and polished. I've also had some tricked-out electric vehicles, but I prefer gas.

RCCA: I can understand how the whir of an electric kind of pales when you drive a real monster truck for a living! Thanks for your time, Kirk.



Dave mounted the upper suspension links to the top of the gearbox with some custom-made mounts. He also made limiting straps for the suspension. Of course, these are modeled after the full-size truck's; Dave even has a small bungee strap holding them together.

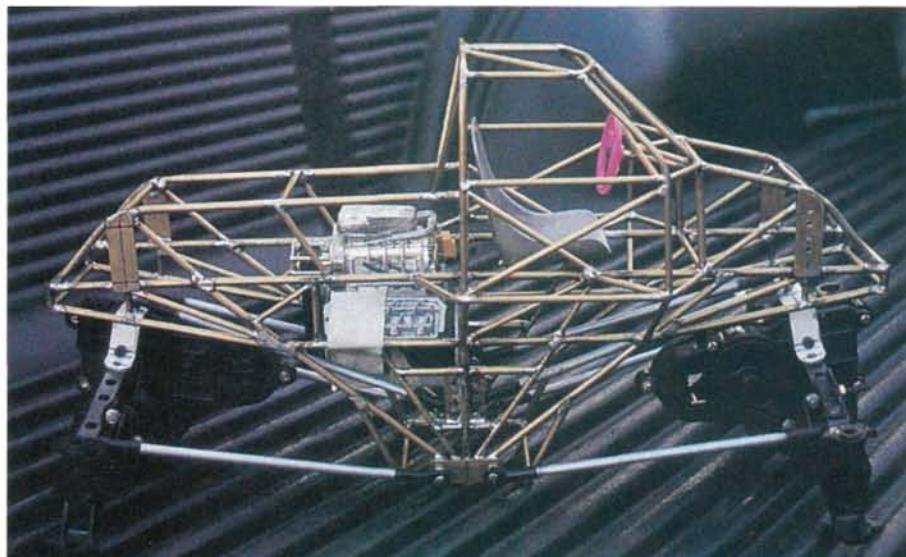


This mud-bog vehicle was made from some spare parts that Dave had lying around. The rear end is made from an old Tamiya Grasshopper; the front end consists of a straight axle stolen from an on-road car. Other features include a custom-painted Bolink* Legend body, 2.2-inch paddle tires, Pro-Line front tires and a custom-made aluminum chassis.

scale projects, the Extreme Overkill features a Parma Hemi engine, but all the chrome has been stripped off the parts and replaced with silver paint for a more realistic look. The engine has the usual wiring and plumbing work, but added details such as a fuel filter and a coil increase the realism. Hoses even run to the model radiator that hides the ESC's cooling fan. At the back of the truck is a set of "batteries" made out of plastic. These house the triple-A batteries that power the small LEDs in the



These are stock Clod Buster tires that Dave ground to look just like full-scale, monster-truck racing tires. It took more than an hour per tire to shave down all the treads. It would be great if someone would produce tires that are molded to look like these (hint, hint).



Dave's fleet of RC cars; he's in love with the hobby.

The truck under construction: parts of the chassis had to be cut and modified until everything fit properly. Not all projects go together smoothly; some need a little tweaking. I'm glad Dave didn't leave that steering wheel pink!



EXTREME OVERKILL

- Blown V-8 engine produces over 1,500hp
- 32 inches of suspension travel
- Driver is not a poser
- Custom-fabricated chromoly tube chassis
- Goes fast when the clutch is dumped
- Truck was designed with an expensive CAD system
- Wrenched on by Dave Pack



EXTREME OVERKILL

- Detailed V-8 engine produces compliments
- 32 millimeters of suspension travel
- Driver is fully posable
- Custom-fabricated brass-tube chassis
- Goes slowly when the batteries dump
- Truck was designed with a no. 2 pencil
- Wrenched on by Dave Pack

driver compartment. A deadman switch on the back of the truck turns the electrics on and off, which is in keeping with a similar engine-shutdown switch found on real monster trucks.

• **Radio gear.** Dave used a Tekin* 420 G2 ESC to power the two Trinity* Sapphire motors that are mounted on the gearbox. One 8-cell 1700 battery gives the truck massive speed and acceleration. Dave used a JR* Alpina PCM radio to control the truck's movement, and a Futaba* 9301 servo manhandles the huge, custom-cut Clod Buster tires.

THE KING!

This has to be the most scale RC vehicle that I have ever seen! Dave's creation is definitely a work of art. When he showed us his handiwork, Dave said he plans to offer similar scale pieces so other modelers can make their own super-monsters—with less work, of course. Vacuum-formed racing seats, gauges, chassis and other parts will be available. For more information, contact Dave Pack at trickracing@aol.com.

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■



RACER news

by George M. Gonzalez

Team Losi Goes Rally?

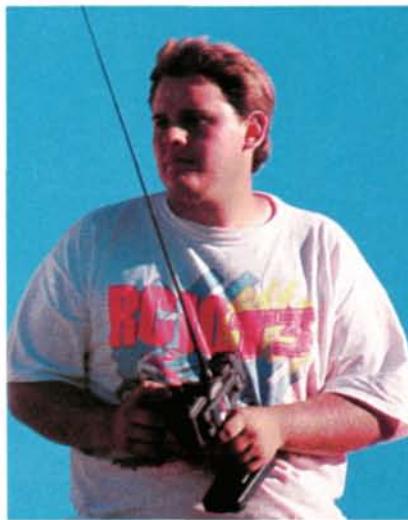
Although Team Losi has no official plans to release a rally car based on the world championship-winning Street Weapon and Double X4 vehicles, team manager Richard Trujillo just couldn't resist converting one for his own amusement. Actually, the Street Weapon platform is perfect for a rally car application because it's the only 190mm-wide TC chassis with a completely sealed drive train and adjustable one-way front drive. For traction control on slippery surfaces, a slipper clutch may also be installed.

According to Richard, the car performs incredibly well both on- and off-road, and he never worries about dirt and crud lodging in the drive train because it's completely sealed. Richard's "Rally Weapon" is shown here with an HPI Ford Focus body and soft-compound rally tires. Converting a Street Weapon into a rally car is really easy, but wouldn't it be great if Losi released a rally car kit with all the goodies in one box? Visit the Team Losi website (www.teamlosi.com) and let them know what you think.



Greg Degani signs up with Kyosho

NORRCA National Champion Greg Degani has struck a deal with Kyosho; he will become the first U.S. factory driver to compete in multiple racing classes exclusively for the Big K. Greg will be competing in $\frac{1}{8}$ -scale gas off-road with an MP-6 International, and he'll be racing Kyosho's new Ultima ST gas and electric vehicles in the $\frac{1}{10}$ -scale truck classes. Greg is a national champion TC racer, so expect to see him competing with Kyosho's TF series touring cars as well. Watch out for Greg; he's got some new colors and a new attitude to boot.



Spashett, Cyrul Claim Cleveland for Trinity and Team Losi!

The 1999 U.S. Indoor Championships, or as racers simply say, "Cleveland," was dominated this year by Trinity's Josh Cyrul and David Spashett. Josh went into the Modified Touring Car main event with a devastating 8-second advantage, while David cleaned house in $\frac{1}{12}$ Mod. Like Josh, David was also the TQ for his class and posted an impressive 13-second lead over Joel Johnson (!) after qualifying. Josh's Team Losi Street Weapon and David's Trinity Switchblade 12 Spashett Edition were both D4-powered and carried the latest 3000mAh cells; watch for an inside look at their winning Losi and Trinity machines soon!

There was great racing in the other classes at the classic Thanksgiving event: Allen Holme won the Stock Touring Car event, Chris Mockerman brought home the hardware for SpeedMerchant in Stock $\frac{1}{12}$, and the legendary Frank Calandra moved over to the Masters division and drove his CRC $\frac{1}{12}$ -scale ride into the record books.

RACER TIP OF THE MONTH

■ Akira Kogawa HPI



Looking for a cool place to install your MIP onboard temperature gauge on your HPI Super Nitro RS4? If you've installed HPI's optional graphite top deck on your car, you can install the temp gauge underneath the upper chassis plate toward the front of the vehicle, as shown in the photo. Akira mounted his temp gauge on the chassis with double-sided tape, and you can easily see the display through the cutout in the chassis. Akira also applied clear vinyl decal material over the cutout in the chassis to act as a window and keep road grime off the unit. In case you're wondering: yes, the temperature probe extension cable is long enough to reach the engine, even with the temp gauge mounted this far toward the front of the chassis.

INNOVATOR AT WORK

Raul

Raul Herrera made the RC scene when he released machined-aluminum chassis braces for the RC10GT and Yokomo MX-4. These parts were an immediate success with racers, and they paved the way for his association with Trinity. Herrera now manufactures many of the machined-aluminum chassis and suspension components that are marketed under the Team Kinwald trade name. This month, Team Kinwald's master machinist—and RC enthusiast, just like you and me—is our featured guest.

Radio Control Car Action: Raul, I understand that the RC industry represents only a small portion of your business. What are some of the larger contracts you service?

Raul Herrera: We mainly manufacture aircraft components for the aerospace industry. We are approved to work for companies such as Boeing, TRW and Hughes. Mostly, we make aircraft and satellite components out of aluminum, titanium and stainless steel. The RC end of our business has really taken off recently, though, and now represents a large part of our business.

RCCA: You have a nice shop filled with lots of sophisticated machining equipment. Who is responsible for running these machines?

RH: We have a small staff of about 25 machinists, but that number fluctuates, depending on the workload at any given time. My brother Joe and I do all the design and setup work, though.

RCCA: How did you first discover RC car racing? What made you decide to become involved in the business?

RH: I actually got into RC about 25 years ago. I've built—and crashed—a few planes over the years. I was first exposed to RC cars when Tamiya came out with a dune buggy. I bought one, figuring I couldn't possibly do much damage to it, but I was really wrong. I competed with the thing a couple of times, but as I recall, the races weren't nearly as exciting as they are today.

RCCA: We've noticed that the Trinity/Kinwald line

Raul Herrera



of machined- and anodized-aluminum parts has become much more diversified, and parts are now offered for many of the popular car lines. This is no doubt partly a result of your efforts, so tell me: how did you hook up with Trinity?

RH: Trinity owner Ernie Provetti sort of hunted me down at M n M Raceway during the Reedy Race last year, after he had noticed Brian Kinwald and Jason Corl using my parts on their cars. We had a great conver-





Raul Herrera (seated) calls up some secret plans on his CAD computer while his brother Joe supervises. You sure would like to see that screen, wouldn't you?

sation, and he complimented me on the quality of our parts. Later, he asked me if I would be interested in designing and manufacturing parts for Trinity. We hashed out an agreement and have been making great stuff together ever since.

RCCA: Has your association with Trinity allowed you to reach more hobbyists?

RH: As you can imagine, our partnership has been very fruitful, thanks to Trinity's awesome marketing power. I know I couldn't have done a better job of getting my stuff seen by people from all over the world. Much of our machine time is dedicated to other projects, but none of them are as fun as the RC stuff.

RCCA: How do you come up with new project ideas? Do you listen to racers and test certain vehicles for potential weak spots, or does Trinity provide most of the work orders?

RH: I try to keep my eyes and ears open for ideas from just about anywhere. I am very lucky to be able to talk to the best drivers in the world right here in Southern California. I also work with the designers at Trinity to come up with new product ideas, and I get to play with many cars that have yet to be released to the public. I enjoy this part the

most because I'm an RC car enthusiast just like our customers.

RCCA: What are some of the development stages that occur before products are packaged and sold to distributors?

RH: First, we look at a particular part to see if it can be machined. I draw it up on CAD so we can determine how long it will take to manufacture and how much it will cost for all the fixtures,

tooling and so forth. From there, we usually make prototypes to test. We then present Trinity with the design for final approval, and once they've given us the order, we go into production. Trinity takes care of the final packaging and distribution.

Hobby Show. How did you guys release the kit so quickly?

RH: Lots of hard work and many sleepless nights! I sure hope Ernie reads this!

RCCA: Have you received any feedback from the lucky racers who got to race it?

RH: It kicks butt! I can say "butt," right? Well, anyway, that's what the people who have driven the car usually say. All kidding aside, the TC3 is an awesome electric vehicle that's begging to go nitro power. The suspension and drive train just fell into place for us. I can't wait to get my prototype back from Trinity!

RCCA: I'm sure you have a long list of projects that you're currently working on; is there any one that you're particularly excited about and can share with our readers?

RH: You're right, we are working on a lot of things. Some of the projects will work out; some won't. I've had ideas that I loved, but because of the machining costs and other restrictions, they were never realized. Then again, there are projects that came out shining after we had almost given up hope, so it's hard to tell. I am excited about manufacturing many machined-aluminum components for Kyosho's TF-4 touring car, however; these parts are strong, lightweight and look beautiful mounted on the car because of the gold-anodized aluminum finish. We may produce parts for other Kyosho vehicles as well; you never know.

RCCA: What do you enjoy doing when you're not at work?

RH: I enjoy being with my family, my wife and two daughters. I play golf and go fishing when I have the time, and I also like to attend RC racing events, as you already know.

RCCA: Will I ever see you on a drivers' stand at an RC event? You know, ROAR offers a "Masters" race for people like you and me who are over 35. "Pops" Losi and Bob Novak regularly compete at these events, so, what do you think?

RH: Oh gosh ... if only I was half as good as you guys! I do race, but it has been a while ... I suppose I should start up again.

RCCA: Thanks again for your time, Raul. Keep making all those cool products, and good luck in your venture with Trinity.

Speed Shop

High-Quality Nylon and Silicone Accessories from GS Racing

You've probably seen GS Racing's* colorful ads showing many of the company's accessories for RC cars, and perhaps you've wondered how the products measure up. I've been testing a few GS Racing items, and I'm here to tell you about them.

The company's nylon servo-saver and servo horns are among the best I've used. The servo-saver is designed for heavy-duty applications and features a stiff internal spring and CNC-machined mounting hub that allows you to crank down hard on the mounting screw without fear of binding up the servo-saver's action. The servo horns feature a metal reinforcing ring at the base for extra strength; two horns are included in each package. Both the servo-saver and servo horns are made from a strong, rigid nylon blend and are available in five dazzling colors including purple and yellow, shown here.

Ever lose a tuned pipe in the heat of battle? If you install one of GS Racing's high-strength, J-type silicone exhaust couplers, you never will again. The couplers have an elbow at one end that grabs on to the exhaust header, and its extra length allows a good portion of the coupler to slide over the tuned pipe as well. The couplers fit extremely tightly and could be run without using tie-wraps, although three grooves are provided for them as well as for extra security. The couplers are available in five colors.

Last, check out the company's nylon ball cups and ball ends. They're sold in packs of 10, and they include the necessary 5.8mm pillow balls and 4mm ball studs. The ball ends are "captured" by the mounting screws (not included); this means they won't ever pop off during a race. For a slop-free fit, the ball cups and ball studs are lightweight and tight. Both the ball ends and ball

coups are molded fluorescent yellow and look really hot mounted on an RC vehicle.

Nylon servo-saver—part number GSS00810 (Futaba), GSS00820 (Airtronics, JR Racing and KO Propo); \$6.49 (five colors available).

High-strength, J-type silicone exhaust coupler—GSMA15 (.12 and .15 side-exhaust engines), \$4.99; GSMA21 (.15 and .21 rear-exhaust engines), \$5.99.

Nylon ball ends—GSB00910, \$4.99; nylon ball cups—GSB00920, \$5.99.



New Team Losi Street Weapon Hoops and Internal Shock Springs

Team Losi* now offers new "inch-up"-style, 7-spoke wheels for the world-champion Street Weapon touring car. These new rims are slightly narrower than Losi's other wheels and, more important, they're 2mm larger in diameter. These new Losi wheels and other, similar larger-diameter designs are now legal for international competition, which allows for proper mounting of ultra-low-profile tires currently being produced, including Losi's own Yellow compound LP slick tires. The wheels are also very rigid, thanks to their larger diameter and narrower bead width that minimizes sidewall deflection (a major bonus for modified sedan racers). Losi's other new design is the Split Spoke Extra Offset; a stylish way to bring your Street Weapon up to the full IFMAR 190mm width while providing an ultra-rigid platform on which to mount your tires. Both wheels are molded from high-impact white nylon and can be dyed any color you like.

Off-road racers take note: Team Losi now offers internal rebound springs (not shown). They are installed inside the shock bodies and are designed to achieve a dual-rate effect. The use of an internal spring softens the rebound of the shock as it reaches full extension, and this allows the vehicle to be run at a lower ride height without losing the necessary travel to clear the bumps and jumps. The internal shock spring set includes four precision-wound springs in varying rates and complete instructions for their use. Although designed for Losi shocks, the internal springs may be adapted to other manufacturers' shocks as well.

7-spoke sedan wheel—A-7805 (white), \$6; Split Spoke Extra Offset—A7803 (white); \$6. Internal shock spring set—A-5080, \$2.50.

Pro-Line Race Numbers

To many people, having a good-looking ride on race day is just as important as winning the race itself. Now you can make your car look like a pro's with Pro-Line's* professional-looking race numbers. The race numbers are available in rectangular and round; standard white and shaded numbers are available. The package includes three of each number (1 through 10), and they have a super-sticky adhesive backing that will adhere to even the dirtiest body yet can be easily removed for quick number changes. Remember: looking good is half the fun, so don't overlook this important concourse touch.

Round race numbers—9920 (white), 9921 (shaded); rectangular race numbers—9922 (white), 9923 (shaded); \$8.50.



RACER PROFILE

Charlie Barnes

Charlie Barnes may not be a national champion driver; in fact, you might consider him an average racer, although his touring cars are always really quick on the track. Charlie is the race director at California R/C Center in Anaheim, CA, and he also works for CEN, so he's not only a hobbyist but an industry representative as well. He's also an inspiration to many because he's always willing to help out a racer in need. With his perspective on the RC racing scene in Southern California and some hot new news from CEN, here's Charlie.

VITAL SIGNS

Age: 26

Occupation: sales and technical support representative for CEN; airbrush artist and race director

Hometown: Fullerton, CA

First RC car: Tamiya Frog

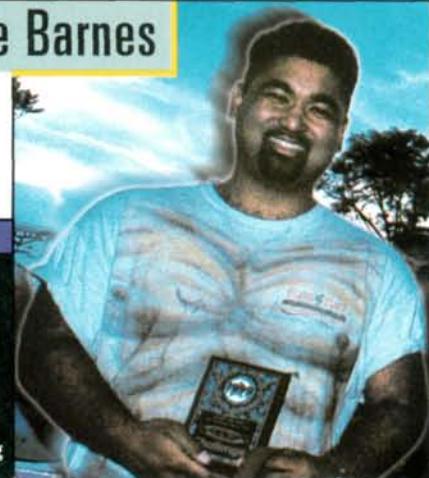
Favorite racing class: modified electric touring

Favorite track: Cal R/C Raceway and Salinas

Raceway

Years racing: 5; hobbyist for more than 14 years

Sponsors: CEN, Hitec, Bonzai Motorsports, Penguin RC, Tekin, Factory Works, Andy's, Coast Airbrush, Pro Match, Xipp and Victor Engineering



Radio Control Car Action: Hi, Charlie; how are things over at CEN? Has the company made any great strides?

Charlie Barnes: They're going great. Although CEN has been in the manufacturing business for over 20 years, the RC division has only been around for a year or so. CEN has already made an impact in the RC industry, which is amazing considering the short time period.

RCCA: CEN displayed its new GX-1R prototype at the last Chicago Hobby Show. This new car looks pretty sweet, and it might just take CEN to the next level of competition. When can we expect this pro-level car to be released? What are some of the company's marketing plans for it?

CB: Although most of our cars are geared toward the entry-level side of the hobby, we have found a demand for more race-ready vehicles. We showed our new GX1 prototype at the Chicago Hobby Show, but we've decided to pull out all the stops and have designed the GX2—an entirely new vehicle that features new suspension and chassis components and also represents a new image for CEN. We plan to go to all the big races and will perhaps even sponsor one of our own. Keep an eye on CEN, because you're going to see a lot more of this car in the near future.

RCCA: I noticed that you're the new race director over at California R/C Center; how's it going? Every time I race there, there's a large turnout, so things must be going pretty good.

CB: Things are going very well. We have an average of 50 to 120 racers on race days, so I really can't complain. The track has a really great atmosphere for fun. There are smiles everywhere on race days, and we have a lot of loyal racers who run there exclusively. If I could reward those racers for their support, I would, but they know I'm a working man, so I'll just take this opportunity to thank all the loyal Cal R/C racers; you know who you are!

RCCA: Nitro touring's popularity continues to grow here in Southern California. What's the ratio of electric to nitro sedans on race days?

CB: Only one short year ago, electric sedans outnumbered nitro sedans eight to two. Now, it's more like fifty-fifty.

RCCA: That's interesting; why do you think nitro power is so popular these days?

CB: RTR nitro vehicles are a giant step in the RC industry. It is now extremely easy to get into nitro racing; anyone can fuel up and

drive a nitro car. In my opinion, RTR RC vehicles attract many new people to the hobby, and as a result, a whole new market has sprung up. The entire RC industry benefits from this new generation of racers because their RTR cars need accessories, too!

RCCA: What have you done to ensure that the racing program continues to thrive over at Cal R/C? Do you have any advice for track owners and race directors in other parts of the country?

CB: If the racers aren't smiling, something is not right. I make sure that nobody gets left out of my program. I try to remember everyone's name, and I make sure they feel comfortable racing at my track. I also take the time to answer their questions, even if the questions seem silly.

RCCA: I've noticed that you take your dog with you everywhere; she's extremely calm and doesn't seem to mind large crowds and loud RC cars. How did you train her to be such a great RC mascot?

CB: Princess is the RC dog of California. She has been to pretty much every track, and she's a big hit everywhere she goes. She'll just walk up to you and fix her "pet me, please" eyes on you, and that's irresistible to most racers. Everyone wants to take her home, but that's not possible because she belongs to all RC racers. Most people learn right away not to get offended when she walks off and heads straight to the next pit table for some more loving. Princess did not receive any formal training, but she has been around RC cars since she was a puppy. That's probably why she loves RC cars—and the smell of nitro—so much.

RCCA: Charlie, what goals have you set for yourself?

CB: I'd like to see CEN succeed in the RC industry. There are a lot of big companies to compete against, but I feel that with our products and the fact that sales have gone up every month, the competition won't be a problem. On a personal note, I'd like to finish animation school; I've already done some airbrush work for motion pictures such as "The Faculty." I'd also like to open up my own track and hobby shop someday. That, of course, is my long-term goal because I'm having way too much fun right now.

RCCA: Thanks for your time, Charlie; I'll see you at the track when I get back to California.



MIP

Race With Us

RACER news



PHOTOS BY GEORGE M. GONZALEZ

The NORRCA Road Course Nats is one of the most eagerly anticipated racing events for touring-car racers, and it's one of the few races in the U.S. that Team Yokomo factory driver Masami Hirosaka attends every year. The fact that the event is held in Las Vegas, NV, is also part of the appeal because many contestants stay a couple of extra days to catch a show or to try their luck at a casino. This year's event was just as exciting as ever, but a few surprises hiked the interest level up a few notches.

The huge Western R/C track is perfect for nitro touring cars. Who knows? Maybe we'll see a nitro touring event here in the future. This track is kind of in the middle of nowhere, but none of the racers seemed to have a problem finding it. I needed a map and a compass to get there!

THE NORRCA Road Course Nats

by George M. Gonzalez

"WHERE WERE THE GTPs?"

Although the Road Course Nats was once a huge event for $\frac{1}{10}$ - and $\frac{1}{12}$ -scale GTP cars (pan cars), electric touring cars have taken over; not surprising, considering TC racing has taken over just about every event once ruled by GTP cars. For the second year in a row, attendance was low in the GTP classes; in fact, every GTP racer there was guaranteed a spot on the A-main grid, and some had to compete against only one or two other drivers. I'm sorry, but odds like those are just *too* good for a national championship-caliber racing event.

Many in the hobby feel that some GTP classes (such as stock) should be removed from the lineup and the touring-car classes expanded to include $\frac{1}{10}$ -scale, fuel-powered touring cars; even, perhaps, the new generation of super-nitro touring cars. In my opinion, the event would be far more successful if



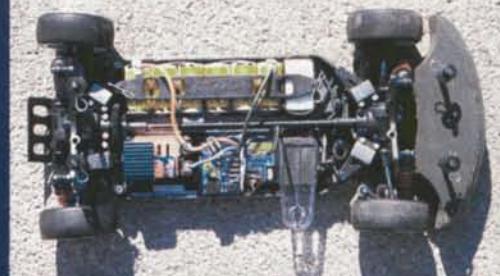
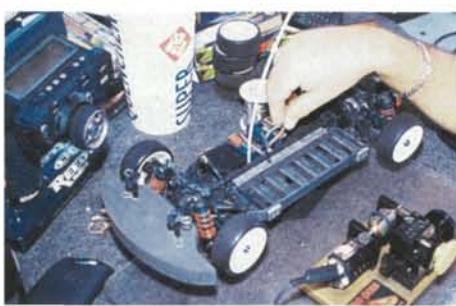
Masami's Yokomo MR4-TC sits on the grid, anticipating the starting tone. The car is airbrushed to match Masami's clothing. What a character!

the nitro classes were added and the GTP classes condensed.



Above: according to NORRCA Road Course Nats tradition, the champion gets a piggyback ride around the track from the biggest guy at the event. Fortunately, Masami took his spurs off before he hopped on.

Right: check out all the ballast on Tony Phalen's TC3. He had to add nearly 5 ounces to bring his vehicle up to weight. According to Tony, a stock TC3 (without all the graphite components) is dead on the NORRCA minimum weight requirements. If he could do it all over again, he would run the TC3 bone-stock.



Top qualifier Don Vinkemulder drove his Schumacher SST '99 to victory in the Expert Mod class. Vinkemulder won the first, finished ninth in the second and came back to win the third A-Main to secure the championship. This car is hopped up with many of Schumacher's high-performance accessories.

Here's Andy Smolnik's Expert Stock-winning Team Associated TC3. Andy scored the A-Team's first national championship for the TC3. Although the car looks stock, it's outfitted with all the available graphite chassis and suspension components and tuned springs.



Check out Masami Hirosaka's ride. The front and rear blue-anodized aluminum chassis braces are from Team Suzuki and are available through Yokomo. The front brace allows you to really crank down on the screws that support the steering bellcranks without binding the steering system. Masami was one of the few Yokomo drivers who used a front one-way diff and a one-way center belt pulley as well. It worked for him; he was the top qualifier and smoked his competition in the Mains to secure the Factory-class championship.

VIVA LAS VEGAS
Though the numbers were down in the GTP classes, they were high in the touring classes; this made the event an overall success. Western R/C always puts on a good show, and with Las Vegas as a backdrop, it's a fun event to attend. We congratulate all the newly crowned NORRCA Road Course Nats champions and send out a big thank you to all the sponsors and racers who attended. If you'd like to see the event changed somewhat, as I would, let NORRCA know; log on to the organization's website and post your opinions. We would all love to see the GTP classes prosper, but perhaps it's time for them to take a back seat and let touring cars reign supreme for a while. Anyway, hope to see you in Vegas next time.

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■

FACTORY TOURING

FIN.	QUAL.	DRIVER	CHASSIS	MOTOR	BATTERIES	ESC	RADIO	TIRES	BODY
1	1	Masami Hirosaka	Yokomo MR4-TC	Reedy	Yokomo	GM V12	KO Propo	Yokomo	Andy's
2	3	Jon Orr	Yokomo MR4-TC	GM	GM	GM V12	KO Propo	Pro-Line	Andy's
3	7	Scott Hughes	Associated TC3	Reedy	Reedy	LRP V7.1	KO Propo	Pro-Line	Protoform

EXPERT TOURING MODIFIED

1	1	Don Vinkemulder	Schumacher SST '99	*	*	*	*	*	*
2	2	Darren Shank	Schumacher SST '99	Fantom	Fantom	LRP V6	*	*	*
3	5	Eric Vasquez	Schumacher SST '99	Fantom	Killer Volt	*	*	Take Off	*

EXPERT TOURING STOCK

1	2	Andy Smolnik	Associated TC3	Reedy	Reedy	LRP V7.1	*	Pro-Line	*
2	1	Nick McMillan	Yokomo MR4-TC	*	*	*	*	*	*
3	4	Tony Phalen	Associated TC3	Reedy	Reedy	LRP V7.1	Airtronics	Pro-Line	Andy's

* = Racer did not supply information



NRCTPA Worlds

by Kevin Hetmanski





Tyler Powell and Joseph Kirkwood prove that you don't have to be an old dude to compete in an NR/CTPA event.



Once again, the National Radio Controlled Truck Pulling Association (NR/CTPA) World Championships were held at the Holiday Inn and Convention Center in Montpelier, OH. A record-breaking 325 entrants—in all classes, from pullers to monster trucks—enjoyed great competition. There were also a few controversies that made it even more memorable.

SPLITSVILLE

To give everyone more room, the racing and pulling events were held separately, in different sections of the hotel—monster trucks on one side and pullers on the other. This was tough on those who had entered both; they had a hard time knowing exactly where they should be and when they should be there, but it all worked out in the end. Here's how it went down.

CONCOURS

This was held before the event on Saturday morning. All entrants were eligible, and with so many well-detailed vehicles on hand, I don't know how they ever picked a winner. Winners were chosen by the members of the NR/CTPA; that makes winning that much better. It's nice to know that a group of people (instead of just two or three judges) like what you've built. There was everything from scale replicas of real

CONCOURS WINNERS
CONCOURS Racing—John Boyer Pulling—Melissa Humes
BEST DESIGN Racing—Kevin Homlund Pulling—John Jacobus
BEST PAINT Racing—Bart Malmone Pulling—Melissa Humes
PRESIDENT'S AWARD Racing—Dave Pack Pulling—Jenny Gross

Shown in action, this conversion kit is offered by K&J Monster Products for the Traxxas Stampede. It uses two Traxxas gearboxes, two motors and custom-made front suspension arms. The Clod rims are attached using custom adapters. Check it out at: www.geocities.com/Baja/Trails/2416/.

RC truckin takes over Ohio

pulling or monster trucks, to trucks with wild paint schemes, to just clean, well-built trucks.

TRUCK PULLING

Four-wheel modified was a new class for the pullers this time around. The NR/CTPA is promoting more "realistic" events, and this new class is a move in that direction.

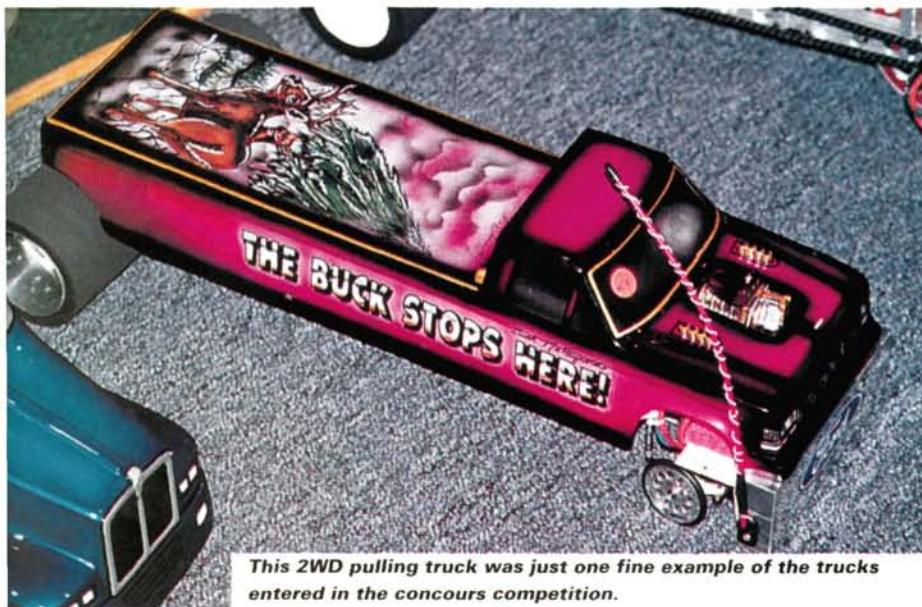
These pullers are based on a Tamiya Bruiser/Mountaineer chassis and must weigh in at 10 pounds. Anyone who has ever seen a Tamiya Mountaineer knows that it has to be the most realistic-looking RC truck. You can design and build your own truck as long as it has front and rear axles and its dimensions are the same as



The pulling trucks were in their own room this year, which allowed everyone to have more space.



Built by John Jacobus, this truck won the People's Choice Best Design puller award. Its features include a scratch-built frame, modified Parma Hemi engine, custom transmission and Tamiya Bruiser axles.



This 2WD pulling truck was just one fine example of the trucks entered in the concours competition.



To make sure they are legal, all pulling trucks must go to the tech table.

the Mountaineer's. This is a class to watch.

Garden tractor was experimental last time but popular enough to be added as a class. These cute little dirt pullers are easy to build. They use a very basic chassis platform and a simple, direct-drive gearbox. The bodies are available from Hooter Chassis and Hobby Shop in Utica, PA.

Dirt pulling is on the rise in the NR/CTPA, and it's even more challenging than the carpet pulling. Just like the real thing, the track can get better or worse as the day goes on.

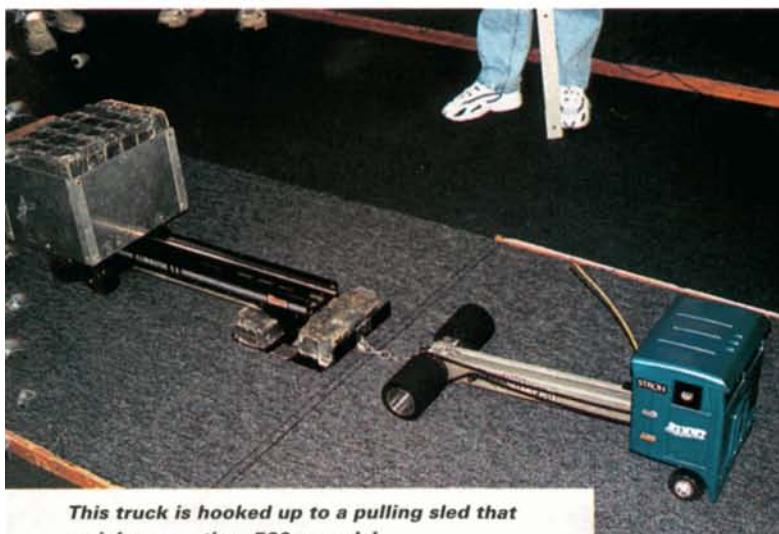
DIRT PULLING

CLASS	DRIVER	WEIGHT	DISTANCE
Gas	Larry Jaques	164 lb.	26 ft., 2 3/8 in.
Insane	Tyler Powell	77 lb.	Full pull*
2WD Open II	Ron Phenicle	110 lb.	27 ft., 9 3/4 in.
Dual Motor Mod	Brad Pitt	99 lb.	29 ft., 1/2 in.
2WD Open I	Roger Brownell	86 lb.	28 ft., 5 in.
2WD Sportsman	J.T. Miller	60 lb.	28 ft.
Dual Motor Stock	Roger Brownell	64 lb.	29 ft., 9 3/4 in.
4WD Box Stock	John Jacobus	49 lb.	Full pull
2WD Super Stock	Gaylord Saulsberry	41 lb.	24 ft., 1 in.
Big Rig	Tina Kilian	41 lb.	29 ft., 7 1/2 in.
Mini Rod	Mike Gross	41 lb.	27 ft., 11 in.
4WD modified	Audrey Pisiak	35 lb.	Full pull
Pro Stock Tractor	Bird Dog	35 lb.	Full pull
Garden Tractor	Mike Gross	13 lb.	29 ft., 3 in.
Digger	Bev Miller	13 lb.	20 ft., 8 3/8 in.

CARPET PULLING

CLASS	DRIVER	WEIGHT	DISTANCE
2WD Open II	Dave Wright	550 lb.	26 ft., 7 1/8 in.
Dual Motor Mod	Brad Pitt	425 lb.	26 ft., 3/4 in.
4WD Open I	Jack Heath	325 lb.	26 ft., 4 1/8 in.
2WD Open I	Joe Kilian	325 lb.	29 ft., 1 1/4 in.
2WD Sportsman	Larry Jaques	250 lb.	26 ft.
Dual Motor Stock	Matt Wilkins	140 lb.	Full pull
Bartire Sportsman	Bud Woodruff	150 lb.	23 ft., 1 1/2 in.
Big Rig	Mike Gross	100 lb.	29 ft., 2 1/8 in.
4WD Box Stock	Doug Corning	80 lb.	Full pull
Pro Stock Tractor	Bud Woodruff	100 lb.	Full pull
Mini Rod	Jack Koogler	80 lb.	Full pull
2WD Stock	Joe Kilian	80 lb.	Full pull
Garden Tractor	Mike Gross	60 lb.	29 ft., 5 1/2 in.
Digger	Thomas Heflin	35 lb.	29 ft., 5 1/2 in.

*Full pull—30 feet or more



This truck is hooked up to a pulling sled that weighs more than 500 pounds!

BANNED!

This prototype chassis created by Darren Grillo caused some controversy. The NR/CTPA officials would not allow it to compete in the tube-frame class because it was made of flat plate that had been cut to look like tube, but it doesn't actually have separate tubes. Darren protested this decision on the basis that the rules state trucks must have "tube chassis" but do not define the term. Is a tube chassis any design that employs cross-members? Must the cross-members be tubes?

The officials turned it over to the racers, and they voted not to allow the truck to run in the tube-frame class (this conveniently helped them avoid having to compete against it).

Here's what I think: if someone finds a loophole in ambiguous rules and builds a truck that does not break any clearly written rules, he or she should be allowed to run. If that allows him an advantage, so be it. The rules can always be amended later to exclude or include the design. A rules meeting is held just for this purpose; NR/CTPA members can express their concerns and tell the officials their new ideas; new rules are voted on and, if passed, are added to the rule book for subsequent years. This is the time to change the rules—not just before the year's biggest RC truck event.

That's the back story; now let's take a look at this truck.

The carbon-fiber-plate chassis has been cut out to look as if it has a tube frame, and its roll cage/cab is made of aluminum sheet. Darren plans to offer the chassis and suspension as a "short-wheelbase" kit with a long-wheelbase-conversion option. Naturally, you'll need Tamiya Clod Buster gearboxes and axles to complete the kit.

Look for this chassis to be offered soon under the Thunder Tech* name. Check Darren's website for more info: <http://thundertech.tsx.org/>.



MONSTER MAYHEM

With the monsters in their own room, they had more space to play in. On Saturday, a tight course was set up, and each truck had six chances to get in a good lap. Then on Sunday, a new layout was put down, and the drivers had three chances to better themselves. Once again, the track was set up using realistic crushed cars and simulated dirt ramps, and two trucks ran at the same time to keep things moving.



Dave Pack's Extreme Overkill monster truck is a true work of art. This bad boy is modeled after the real Overkill monster truck. Check out the "Homebuilt" article in this issue for more info on this hot vehicle.



A lot of time and effort go into some of these paint jobs. These two Clod Busters had some of the best airbrushed paint jobs I have ever seen.

The tube-frame class was my favorite; realistic-looking monsters jumping over realistic crushed cars! Too cool!

A new feature of the monster truck scene was the long-jump sponsored by Progressive Suspension. Each person who entered had just one chance at making the longest jump he or she could get out of their truck. This is still a new event for the NR/CTPA; if there's enough interest, it could be a permanent contest at the Worlds.

The Run-what-you-Bring class was also new. This is an "anything goes" class. For example, if you choose to use a shifting transmission or cobalt motors or any other crazy modification, you can run it in this class; there are no motor, battery, weight, or gearbox restrictions. The vehicles must be electric-powered, 4WD and have a minimum 7.5-inch wheel diameter, and their wheelbases must not exceed 14 inches when fully

THE POWER...



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1/8 scale racing chassis**

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Original design, others follow...

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V-SERIES

SPEC 2000 FEATURES

- Narrow rear end conversion-set (extra) quicker steering response
- Aluminium wheel-adaptor set front/rear, fixed (extra)
- Conical wheel-shim set front/rear
- Carbon shock support rear and ball-type shockmounting-set
- Adjustable rear anti-roll bar set (extra)

NovaMega SX-21 EV4
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Left: here is a bird's-eye view of the monster truck course. It doesn't look like a tight course, but the drivers had a difficult time getting around the track.



Great paint, Batman! (I couldn't help myself.)

compressed. With wide-open rules such as these, we're sure to see some interesting trucks in 2000.

SEE YOU NEXT YEAR

RC truck pulling and the NR/CTPA are family oriented; you see parents, children and grandparents all competing and having fun at the same time.

This time, we saw some controversial decisions, but we saw new events, too, at this, the biggest Worlds yet. That can only mean good things for RC trucking. If you would like more information on the NR/CTPA, check out its website at www.webt.com/RCTruckPul, or call (716) 627-4321. And keep on truckin'! ■

MONSTER & TUFF TRUCK RACING

CLASS	DRIVER	LAP TIME (secs.)
2WD Stock Tuff Truck	Dan Wyatt	37.017
2WD Super Tuff Truck	Charlie Miller	32.823
2WD Modified Tuff Truck	Bill Herzog	29.818
4WD Modified Tuff Truck	Dan Wyatt	32.087
4WD Box Monster Truck	Tim Powers	52.027
4WD Super Stock	Bari Musawwir	47.392
4WD Tube Chassis	Eric Beach	42.352
4WD Modified Monster Truck	Bill Herzog	22.060

LONG-JUMP

CLASS	DRIVER	DISTANCE
2WD	Hank Wyatt	15 ft., 9 in.
4WD	Tim Powers	15 ft.

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By evolution, Team Serpent continues to push itself to even higher levels of performance.

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IMPACT M2

SPEC 2000 FEATURES

- Lowered center of gravity
- New design carbon radioplate with new battery position
- Lowered fueltank position
- Radioplate bracket in aluminum
- New design 4mm chassisplate 7075 T6 alu
- Adjustable front anti-roll bar set
- New rear bodymount GTP design
 - Lowered rear up-rights
 - Rear shocktower in carbon with 2-shockpositions
 - Ball-type shock-mounting
- Aluminium quick change levers (in 2WD only rear)
- Full color instructions

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1/10 scale chassis



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- 1998-1999 IFMAR World Champions Group-C and Touringcar
- 1999 ROAR National Champion

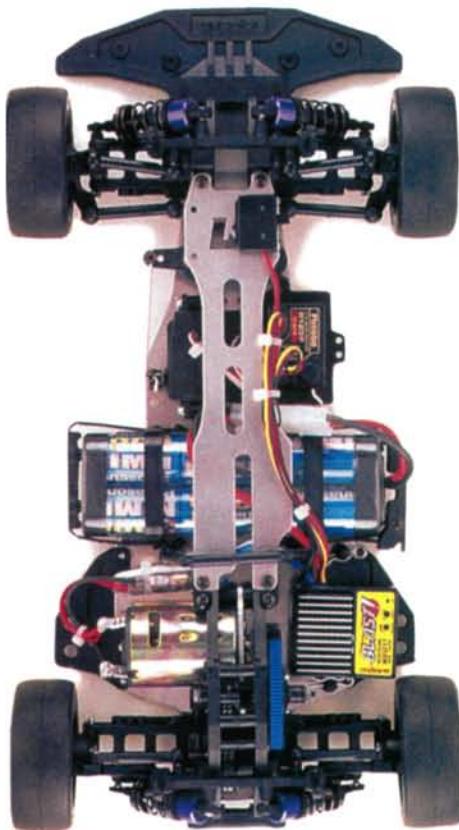
www.serpent.com

NOVA
MEGA

Kyosho PureTen EP Spider 2WD Dodge Ram

by Kevin Hetmanski

Kyosho* gets you from the box to the open road fast by preassembling the major chassis components on the electric 2WD Dodge Ram Spider. A prebuilt drive train, steering bellcranks, front and rear bulkheads with shock towers and an upper plate are all bolted to a double-deck aluminum chassis that gives the car a sturdy foundation. A detailed instruction manual makes the rest of the assembly a snap, and the included oil-filled shocks are a bonus. Wrapping up this great package is a well-detailed Dodge Ram body and decal set.



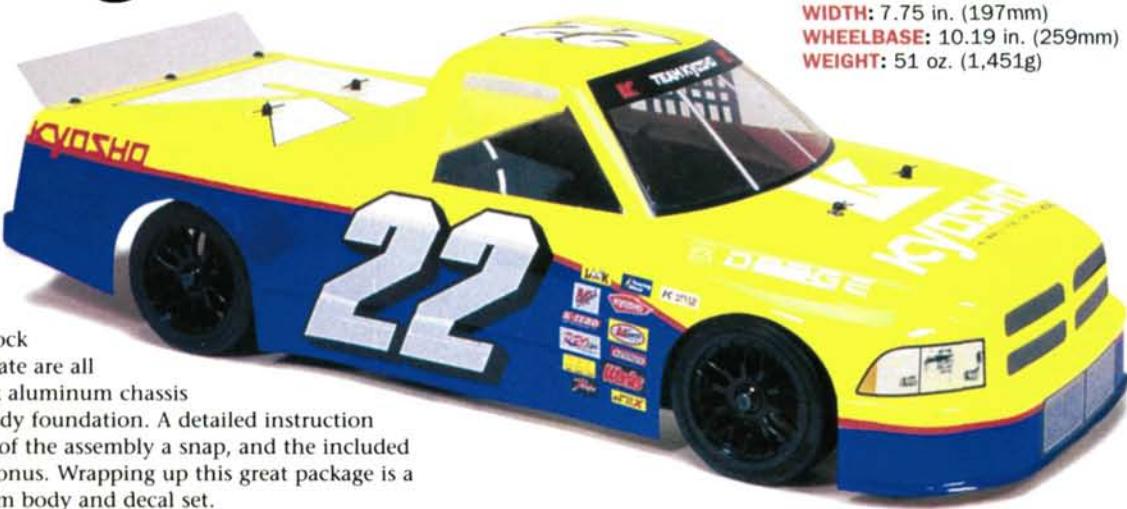
PERFORMANCE

Although the truck does not have a high top speed, its torquey stock motor gets it out of the hole quickly. Two-wheel drive makes the Ram fun to drive; it's really easy to get this bad boy to slide around. The efficient drive train coupled with the stock 540 motor gives you long run times on one battery pack. If 4WD is what you crave, the platform can be converted easily using the optional Kyosho parts listed in the back of the manual; basically, the Ram is a front diff, dogbones and a belt away from 4WD.

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■

Required Accessories

- 2-channel radio with receiver.
- Steering servo.
- Electronic speed control.
- 6-cell stick battery pack.
- Battery charger.
- Paint.
- CA glue.



LENGTH: 18.5 in. (470mm)
WIDTH: 7.75 in. (197mm)
WHEELBASE: 10.19 in. (259mm)
WEIGHT: 51 oz. (1,451g)

Features

- Lower A-arm suspension with one-piece upper links.
- Kyosho high-grip tires.
- Metal gear differential.
- 540-type motor.
- Coil-spring, oil-filled-type shocks.

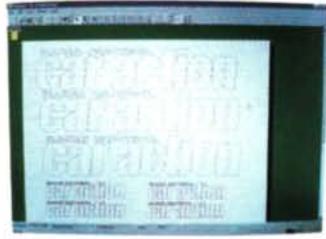


PHOTOS BY WALTER SIDAS

Apply Vinyl Decals

by Greg Vogel

First it was anodized hardware, then colored fuel tubing; now vinyl decals are the new craze for customizing a car. Vinyl-decal logos of several manufacturers are available to trick out your ride, and decal-making machines, such as that offered by Roland Digital Group*, allow you to create your own decals and graphics. Believe it or not, there is a correct way to apply a decal. Here is a step-by-step guide to success: no air bubbles, no wrinkles and no unsightly, uneven letters.



1 DESIGN. Some companies sell pre-cut decals that are ready for application, but we'll start at ground zero with Roland Digital Group's decal cutter. This very precise tool creates custom paint masks and decals; hand-cut graphics look kinda hack. The computer software and cutting machine kit allow you to design your own logos and graphics or to import graphics from a scanning program. Here, I'm using basic fonts supplied with the cutting program to create a logo decal.

2 CUT. After the decal has been designed, all you have to do is select the "Print-Cut" command, and the machine takes care of the rest.



3 WEEDING. After the machine has finished cutting the decal, you must remove (or "weed") the negative spaces (or insides) of letters such as O, P, D and Q and any areas where you want the vehicle's surface to show through. Use a hobby knife to pull up the material.



4 MASK WEEDING. Vinyl decals may be used as masks for painted-on graphics. There are two ways to weed and use a mask decal. You may weed the letters as negative space, leaving the decal material on the outside; when paint is applied, the letters will show up "positive" when the mask is removed. The other way is to remove the vinyl outside the letters, so they will be "negative"—visible as clear Lexan—until a color is applied; this technique is useful for painting light-colored letters on the inside of dark-colored bodies. No matter

which technique you use, remember to reverse the letters when using decals as a mask. When applied to the body's inside, the reversed letters will read correctly on the outside.

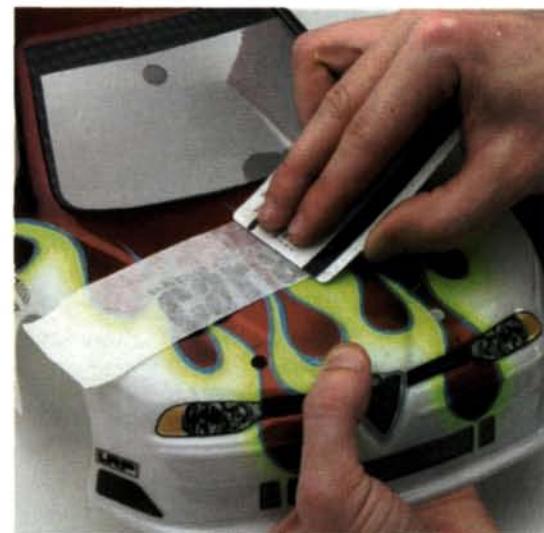
Parma Vinyl Graphics

Parma has released a great new lineup of vinyl graphic masks for application on the insides of car bodies. Like the decals mentioned in the main article, a mask has to be weeded and transferred from the backing to the body with transfer tape. When placing one of these masks on the inside of a body, I recommend that you eliminate the wetting step described in the article. Glass cleaner can leave a chemical film on the body that will prevent paint from sticking. The best way to position a mask is to roll it on a little at a time. This allows you to work the decal onto the body with maximum adhesion, so paint will not bleed under the mask. The hairdryer comes in handy when applying vinyl masks, as you can push the heated, more pliable material into crevices.





5 TRANSFER TAPE. Transfer tape is used to remove a vinyl decal from its backing without disturbing the alignment of the decal's individual letters or design elements. Once the decal has been completely weeded, apply transfer tape over it, making sure you cover every component of the design. Although it looks like masking tape, transfer tape has a "low tack" adhesive that sticks just enough to pull the vinyl off the backing sheet, but not so much that it then pulls the decal away from the object to which it has been applied. Masking tape will work in a pinch, but genuine transfer tape is best. You can get it from a sign supply shop. You could try to remove the letters or graphic elements one by one, but if you do, you risk placing the pieces unevenly.



6 APPLICATION. After placing a decal on the vehicle's body, press it down, working outward from the center to remove air bubbles. A credit card, (or plastic library card in my case; it's the only time I use it) comes in handy here. Use it to squeegee the decal. By "working" the decal, there is less chance of having air bubbles trapped under the decal. If air bubbles remain under the decal, prick them with a pin and work the air out using the card.

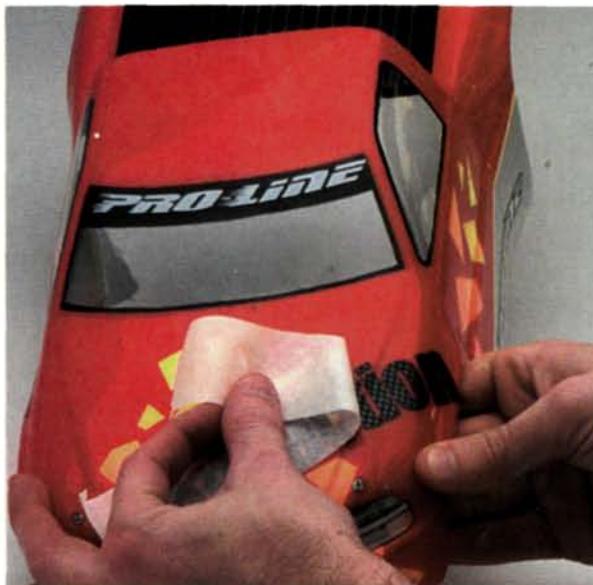


7 APPLICATION OVER CURVES.

Placing a decal is easy if the surface is flat like a wing or a hood, but on a curve the potential for wrinkling is increased. Here is where the job becomes time-consuming, but a little effort makes the difference between a graphic you can take pride in and a hack job. Spray the area of the body where you wish to apply the decal with an alcohol-based glass cleaner, then apply the decal to the wet surface. The slippery surface will allow you to slide the decal into position and to work the decal over the curve before it dries.



8 FORMING. Another way to apply a decal over a curve is the forming method, using a hairdryer. With the dryer on the "low" setting, heat the decal while working it with a plastic card or fingertip to help smooth it over the curve.



9 FINAL TOUCH. When the decal is finally stuck on, you can remove the transfer tape. Slowly peel the tape off the decal, and check for decal edges that are still sticking to the tape. If a portion of the decal stays stuck, roll the decal and transfer tape back down on the body and burnish it down with a fingernail or card. You could also slip a hobby knife between the decal and transfer tape and separate them partway. Hold the piece of the decal you burnished down on the body and try pulling off the transfer tape again. A short blast of hot air from the hairdryer will reactivate the adhesive and the decal will stick better.

Applying vinyl decals is fairly easy, but it can be time-consuming. If you do take your time, you will be rewarded with wrinkle- and air-bubble-free decals. ■

10 Must-Have Tools

Is your box stocked?

by PETER VIEIRA

I promised myself I wouldn't make any "Home Improvement" references in the intro to this article; that would be too easy. Bob Vila is off limits, too. Let me just say that having the right tools can make all the difference to the quality of your bench time. Show me an RC guy who doesn't like to work on his cars, and I'll show you a guy with a crummy set of tools. On the other hand, a pit box stocked with high-quality implements—the right tools for the right jobs, as my dad would say—makes doing any maintenance or repair task a pleasure.

I've picked a selection of tools that includes items you may not have known existed and classics you simply must have. Just be sure to put your name on them; I guarantee they will be borrowed!



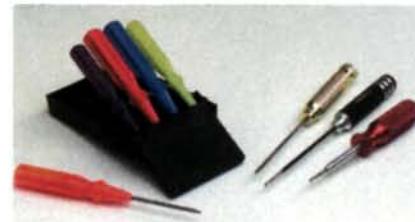
BRUSH HOOD ALIGNMENT TOOL

This is Parma/PSE's* hood alignment tool. Just loosen the endbell hardware and then press the tool over the hoods. The tool is two-sided to work with laydown or standup brushes.

What it does: this gizmo makes certain that your motor's brush hoods are lined up precisely, so the hoods don't artificially alter the motor's timing or efficiency.

Why you need it: misaligned brushes can contribute to premature brush wear and reduced performance. Stock racers, in particular, should have this tool, but anyone who wants to be sure he's getting maximum power from his motor should add one to his pit box.

What you'll pay: \$13.



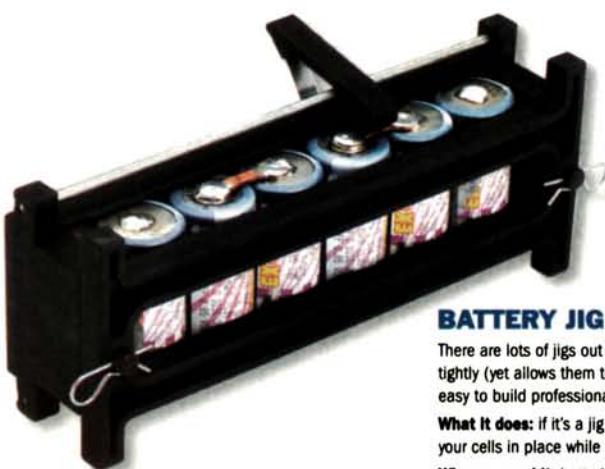
HEX DRIVERS

There are plenty of good hex driver sets out there, including inexpensive (but excellent) RPM* sets (left) and all-metal tools from OFNA*, Hudy* and Dynamite* (right, in that order) and others. Let your budget and sense of comfort be your guide; if the handles feel good and you can afford the ones you like best, buy them.

What they do: more important is what they don't do. They don't strip screws or lose their edge. Unlike the cheesy L-wrenches included with kits, high-quality hex drivers won't round themselves or the fastener they're inserted into. Hex drivers are also much easier to use because of screwdriver-type handles that provide more screw-tightening torque and don't require room to "swing" like the long end of an L-wrench.

Why you need them: hey, if you like goofed-up screws and frustration, you don't need these at all.

What you'll pay: \$30 and up (set of 4 or more).



BATTERY JIG

There are lots of jigs out there but the Deans* battery jig has quickly become a favorite; it holds cells tightly (yet allows them to be removed easily) and includes a clever battery-bar hold-down that makes it easy to build professional-looking packs.

What it does: if it's a jig, it must hold something; could it be ... batteries? Yep; this handy item holds your cells in place while you solder them together.

Why you need it: batteries love to roll off benches or squirt out of whatever you rig up to hold them, and that makes it nearly impossible to assemble a neat, tight pack. A battery jig holds the cells firmly, so you can attach the battery bars with ease.

What you'll pay: \$7 and up.



BODY SCISSORS

See the curve of the blades? That, coupled with their easier-to-maneuver short length, allows body scissors to snake around curves with ease. DuraTrax*, Horizon*, Tamiya* and others offer good scissors for less than \$15.

What it does: these short, curved-blade scissors are designed just for trimming Lexan bodies, and they easily cut curves around wheel wells, rocker panels, windshields, etc.

Why you need it: if you've ever trimmed a body with "regular" scissors—especially a big ol' pair from the kitchen drawer—you already know why you need specialized scissors. Body scissors allow you to trim off waste material without wasting your paint job or leaving an unsightly shark-tooth edge.

What you'll pay: about \$12.



FLUSH CUTTERS

The excellent cutters shown here are from Hobbico; many hobby shops carry a similar set from Xuron, and RadioShack offers flush cutters as well.

What they do: all RC kits require that plastic parts be snipped off parts trees, or they have parts with tabs or pins that must be removed. This tool makes short work of those tasks, and it's also handy for cutting wire, fuel tubing, body posts and more. Anything made of plastic or soft metal can be cut, but don't try to cut music wire; you'll ruin the jaws.

Why you need them: unlike plain ol' diagonal cutters, which tend to leave a little "nub" behind, flush cutters leave virtually no waste on the piece after the cut has been made. That saves time and energy, and since you'll find yourself reaching for the X-Acto knife less frequently, it's safer too.

What you'll pay: \$8 to \$15.

A REAL SOLDERING IRON

This Ungar* Super Race Station is one of the most popular irons in RC thanks to its quick-heating and long-lasting tip assembly, heavy-duty construction and adjustable temperature. Weller and Craftsman are also good brands.

What it does: solders, of course. Use it to assemble batteries, wire ESCs, install capacitors ... the list is endless.

Why you need it: because \$10 "hardware department" irons just won't cut it. Building a battery pack or hard-wiring a motor with one of those el cheapo soldering irons is an exercise in futility. Get yourself a 120W (or better) pencil-type iron with a spring base to hold it.

What you'll pay: \$70 and up.



CAMBER GAUGE

It's a classic! The RPM camber gauge has been around for years because it's simple, inexpensive and it works.

What it does: camber refers to the inward or outward "tilt" of a wheel as viewed from the front or rear of the car. A camber gauge measures the angle of the wheel tilt.

Why you need it: it's impossible to accurately set camber just by eyeballing the wheel, yet many racers rely on guesswork to set the camber on their cars. Even if you guess correctly, how will you be able to repeat the setting if you change it or replace a camber rod? Get a camber gauge; you'll use it often. Really.

What you'll pay: \$12.



ROTARY TOOL

"Dremel" tool is often used as a generic term for rotary tools, but Dremel is indeed a brand name and is certainly a good one to look for. If you can swing it, go for an AC-powered tool with fully adjustable speed and a decent selection of bits. At the very least, get a sanding drum, a wire wheel and a cutoff wheel. Dremel's top o' the line model is shown; it features digital RPM control and a load sensor that maintains the speed setting when the going gets tough. Cool.

What it does: aw man, what doesn't it do? Depending on the bit you install, this motorized wonder will polish hinge pins, drill holes, scuff rims, cut music wire, bevel battery slots—you name it.

Why you need it: a rotary tool saves you loads of time—time you could spend practicing, reading Radio Control Car Action, bench-racing, or planning a really good practical joke. Besides, you aren't officially an RC car guy until you own a rotary tool.

What you'll pay: \$60 and up.

PHOTOS BY WALTER SIDAS



DIGITAL VOLTMETER

RadioShack and Sears will probably be your closest sources of a digital voltmeter. You don't have to spend a lot; this Craftsman unit cost less than \$20.

What it does: this device measures voltage, and most digital voltmeters also have functions to test resistance, continuity and diode operation.

Why you need it: if you ever find yourself facing an electronic dilemma, this hunk o' hardware will help you find the problem. You can check cell voltages, test Schottky diodes, confirm ESC settings and test solder joints.

What you'll pay: \$15 and up.

TAPERED REAMER

There's an easy way and a hard way to make holes in Lexan; this is the easy way. Once you've tried one, you'll wonder how you ever mounted bodies without a reamer.

What it does: a reamer bores perfectly round, smooth-sided holes in soft materials.

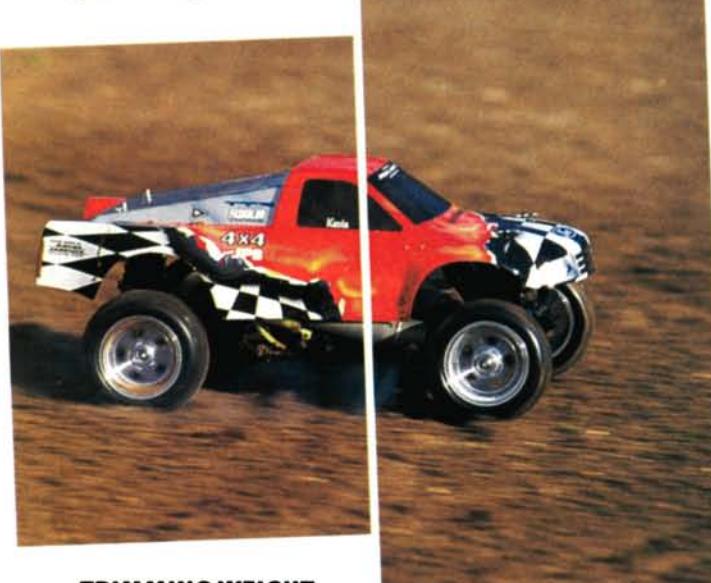
Why you need it: this tool is mainly used for bodies. A hobby knife can make a decent hole up to 2 or 3 millimeters across, but anything bigger (such as a body-post hole) gets really ugly really fast. A reamer will make short work of the job, and its taper allows you to make a hole of any size you need.

What you'll pay: \$20.

Tuning and modifying your Nitro Thunder King

Since our first test of the MRC* Nitro Thunder King in the November '98 issue of *Radio Control Car Action*, I've been pounding on this unique truck almost nonstop. After my last outing, I decided it was time for a complete rebuild, but as I began to wrench, my creative juices started to flow: why not go wild and rebuild the Nitro Thunder King as an all-out performer? I decided to maintain the durability of the stock truck, but I modified everything else for maximum performance. The mods are easy to make, and even if you don't go as crazy as I did, I'm sure you'll be able to put some of my tips to good use.

Long live the King!

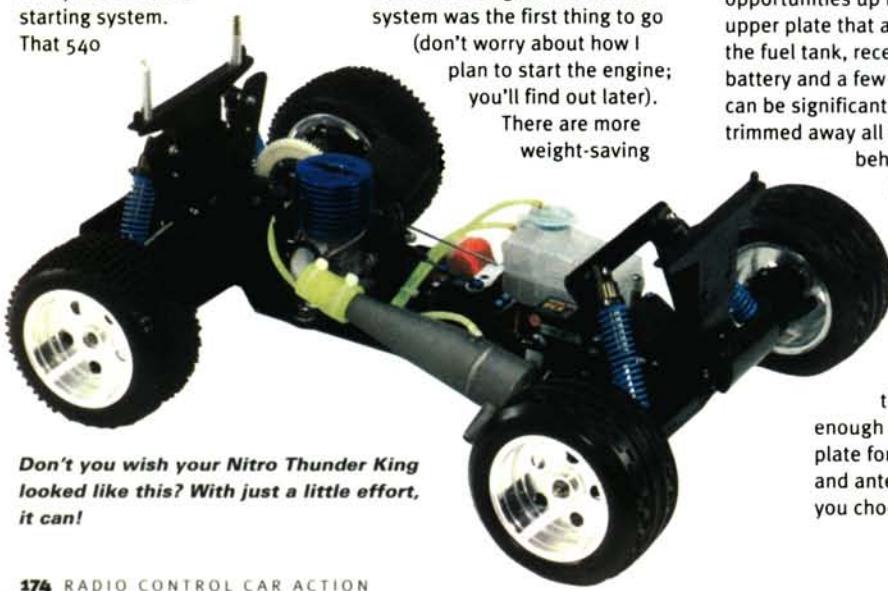


TRIMMING WEIGHT

The first thing everyone notices about the Nitro King is its weight—as in there's a lot of it! A big chunk of its heft is accounted for by the onboard starting system. That 540

electric motor is just sitting around in the chassis bumming a ride until that big .21 engine needs cranking, so the starter system was the first thing to go (don't worry about how I plan to start the engine; you'll find out later).

There are more weight-saving



Don't you wish your Nitro Thunder King looked like this? With just a little effort, it can!



PARTS USED

MRC	OFNA	Hitec servos
Baja King	• Steel brake discs—	• Steering—
• Rims (F/R)—part no.	31022.	HS-945MG-329455.
9632037/9632038.		• Throttle/brake—
• Tires (F/R)—	Kyosho	HS-545BB/315455.
9627007/9627005.	• Landmax Superflow	
	F150 body—	Nuova Faor
	KYOC2506.	• Fuel tank—ART.S11.
Thunder Tiger	• Blue $\frac{1}{8}$ -scale springs—	ESP
• Pull-start engine	KYOC3052.	• Standard ball-link set—ESP3001.
Pro 21BXRP—TTR9428.		



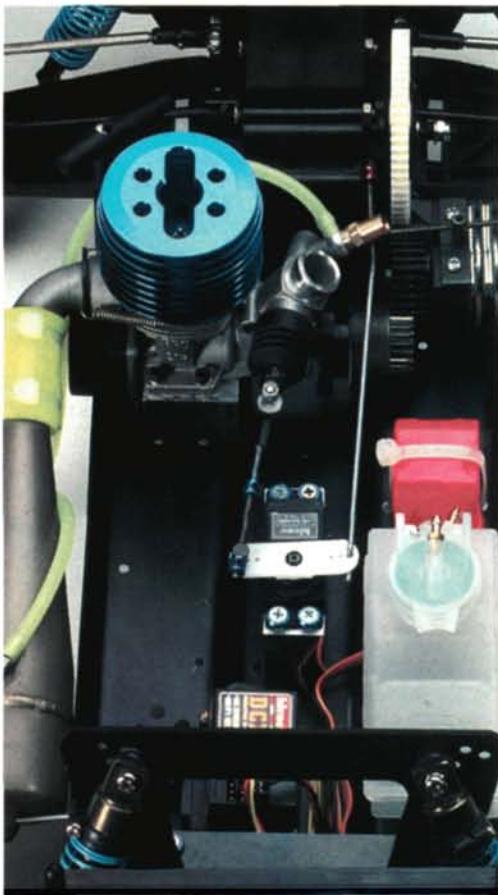
opportunities up front: the huge upper plate that accommodates the fuel tank, receiver, receiver battery and a few other doodads can be significantly cut down. I trimmed away all the material behind the servos.

In addition to lightening the truck, this allows easier access to the two servos, and there's still enough room on the plate for the receiver and antenna post if you choose to do so.

ADD A PULL-START

The Nitro King's chassis does not have an opening for a starter-box wheel and I had shelved the electric onboard starter, so a pull-start engine was the ideal choice. You can buy the pull-start mechanism separately, but you'll also have to buy a new crankshaft for the engine. I already had a pull-start engine, so I set the truck's original bump-start mill aside for use in one of my $\frac{1}{8}$ -scale buggies.

I quickly discovered that the pull-start on the new engine interfered slightly with the chassis where the sides are folded upward, but the fix was simple: I just ground the chassis with a



A pull-start Thunder Tiger engine replaces the non-pull-start unit. The header is a modified unit from a Schumacher .21 extreme car. Note the cutout in the chassis under the pull-starter unit.

This shows how much the layout has been changed. It is now much simpler and very effective.

Dremel* tool to increase clearance.

I wanted the engine to be able to breathe better than the included pipe would allow, so I added a tuned pipe. To install this, I used a Schumacher* header from the 21 Extreme on-road car. I cut the header halfway down the bend, then I slightly flared its end and connected it to the pipe using a silicone exhaust coupler. To finish off the installation, I made a music-wire pipe support.

BRAKE UPGRADES

The truck's brakes worked fine, but I knew they could be better. After a little thinking and searching, I came up with an OFNA* dual-disc brake setup from the Ultra Worlds GTII 1/8-scale off-road car. This setup gives more consistent, stronger braking, and the steel discs look cool. They had to be ground slightly to fit the truck's brake hex properly, but this required only a minute or two of rotary-tool attention.

CHASSIS LAYOUT

Thanks to the space I freed up when I removed the starting system and most of the upper deck, I

was able to rearrange the chassis layout. I moved the receiver and antenna mount to just under the front shock tower (far away from electrically "noisy" parts).

I replaced the stock fuel tank with a Nuova Faor* racing unit. This tank features interior baffling that prevents the fuel from sloshing around too much. I drilled two new mounting holes in the chassis and installed the fuel tank on the truck's left side.

The stock throttle and brake

linkages are a little crude and don't give very good throttle response. To remedy this, I moved the throttle servo to the center of the chassis to align the servo with the carburetor. I then turned the carburetor 180 degrees from the stock position and made a linkage to connect the servo directly to it.

To dial in the brakes, I cut the original brake lever down, mounted the end with the loop 180 degrees from the stock position and installed a new wire linkage to connect it to the servo.

REDUCING SLOP

I replaced all the stock ball ends with heavy-duty units from ESP*, and this almost eliminated suspension-link slop. The lower A-arms on the truck still showed signs of play, however, so to solve this problem, I removed the sus-

pension arms and filled their hinge-pin bores with epoxy, then I coated the hinge pins with shock oil and slid them into the arms. The shock oil prevents the epoxy from sticking to the hinge pins. Once the epoxy had cured overnight, I removed the pins, cleaned them off and reassembled the suspension—smooth action, minus the slop.

To further help the truck glide along smoothly, I replaced the stock bushings in the rear hub and front rims with ball bearings.

OTHER STUFF

A Hitec* HS-545BB servo now handles the throttle/braking while a Hitec HS-945MG servo points those big front wheels. In place of the stock tires, I used MRC's optional step-pins in the rear and ribbed tires in the front; these will improve traction on most off-road surfaces. I also installed custom-made, foam-strip inserts to support the treads.

DRESS IT UP

To further enhance its looks, I removed the servo mounts and engine mounts and I took off the anodizing. Then I polished the pieces using my Dremel tool and aluminum polish. Kyosho's* blue 1/8-scale springs dress up the shocks and give the truck a cushy ride. I also modified the front bumper by cutting it down to racer size and drilling holes that allowed me to mount it closer to the suspension arms.

For something different, I topped everything off with a Kyosho Landmax Ford F-150 body, and Richard Muise of Motion Graphics* laid down a killer paint scheme for me. But when looking

Hooter's Nitro USA-1 wheel adapters for Clod Buster

Nitro USA-1 wheels are very detailed and look ultra cool, but they didn't fit the Clod Buster—until now. Thanks to machined-aluminum adapters from Hooter Chassis and Hobby Shop*, you can bolt the Kyosho rims onto your Tamiya Clod Buster without modification. The adapters have been machined on one side to fit the stock Clod's splined hex, and the other side is keyed to the Nitro USA-1 wheel.

Hooter Chassis and Hobby Shop, Rte. 322 in Hannaville, RD#1, Box 99, Utica, PA 16362; (814) 425-3122; fax (814) 425-1595; www.hootchas@alltel.net.



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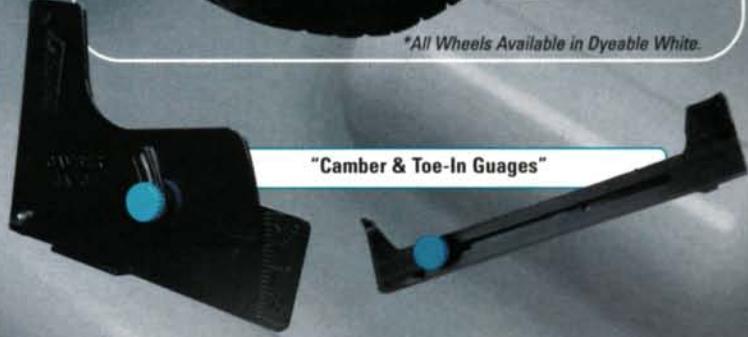
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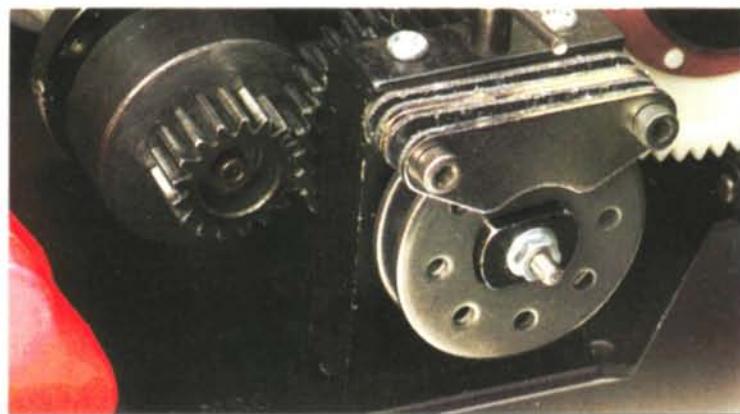
Does ESP offer an assembled version of the Clodzilla 4 or Clodzilla 3 full race kit that is ready for me to put my radio gear and motors into? I really like the Clodzilla, but I don't want to spend the money on a Clod Buster or Bullhead just to toss out many of the parts when I convert to the ESP chassis. I really appreciate your help.

Alex Swies, Livonia MI

Well Alex, I talked to Eric Sutcliff at ESP and he informed me that ESP doesn't offer prebuilt kits. It is too time-consuming to do, and getting the parts to build a huge fleet of trucks is sometimes a problem. That leaves the option of building the ESP chassis yourself and only buying the Tamiya parts you need to complete it, but believe it or not, it is actually cheaper to buy a complete Clod Buster or Bullhead kit instead of buying the spare parts you need to complete the aftermarket truck.

If you have any problems or questions about trucks, or if there is something you would like to see in "4x4," email me at kevin@airage.com or send your letters to:

"4x4"
RC Car Action
100 East Ridge
Ridgefield, CT 06877-4606 USA



For the ultimate in stopping power, I use a dual-disc brake setup from OFNA. I had to grind the discs slightly to make them fit.

at the completed truck, I still felt it was missing something—trick wheels. JPS Products* supplied a set of beautiful aluminum rims. These added back some of the weight I had removed, but who cares? They look great and they're strong.

FINAL THOUGHTS

After completing this project, I'm not only going to hit the backyard, but I also plan some track time. This project

shows that even if its manufacturer doesn't make hop-up parts for a vehicle, you can still modify it. I had a lot more ideas for the truck, but they would require special machine work, so I kept myself under control.

I have a lot of crazy projects on my plate, so tune in next month; you never know what you'll get.

*Addresses are listed alphabetically in the Index of Manufacturers on page 216. ■

NEW

L. Collari Innotech

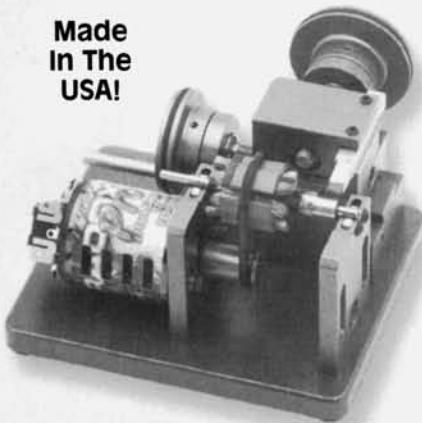
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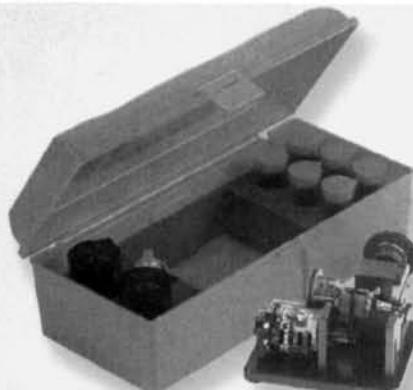
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RC4113	Stock To Mod Conversion	\$69.99
	Converts older Trinity stock lathe to new ball bearing modified style.	
RC4105	Tru-Lathe 2 Pro Diamond Bit	\$85.99
RC4109	Tru-Lathe 2 Pro Carbide Bit	\$15.00



Tru-Lathe 2 Pro comes in carrying case with carbide bit, motor tubes, armature tubes and commutator cutting fluid. Requires stock motor and battery, (not included) for operation.

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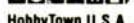
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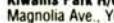
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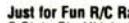
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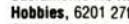
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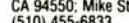
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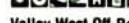


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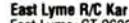


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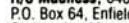
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Miller (850) 863-1666



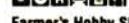
Broward County R/C Race Club,
Mills Pond Park, Ft. Lauderdale, FL
Ed Decembero, (954) 525-3304



Burton's R/C Raceway, 4215 Mustang
Rd., Lakeland, FL 33803; Louie
Burton, (941) 665-1322



Coral Springs Roadrunners, P.O. Box
9632, Coral Springs, FL 33075;
John Argentino, (954) 925-8284



Farmer's Hobby Shop & Raceway,
5006-3 E. Broadway, Tampa, FL
33619; Greg Carbone, (813) 248-3314



Key to Symbols

Indoor

Outdoor

Off-road

Oval

Dirt oval

Carpet

Concrete

Asphalt

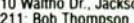
On-site hobby shop

AC power

Auto lap-counting

Food available

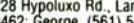
First Coast Speedway,
6410 Waltho Dr., Jacksonville, FL
32211; Bob Thompson,
(904) 743-2161



Frontier Race Track, 15260 N.E.
244th Ave., Salt Springs, FL 32134;
Harold Reel, (352) 685-2881



G & C Hobby Raceway,
1228 Hypoluxo Rd., Lantana, FL
33462; George, (561) 547-3812



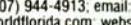
Greater Orlando Auto Racers,
970 Keller Rd., Altamonte Springs, FL
32714; Rob Michael, (407) 834-9299



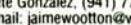
Hobby World Raceway, 7273 103rd
St., Jacksonville, FL 32210;
Greg, (904) 772-9022



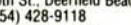
Kissimmee R/C Auto Racing, Model
Craft World, Osceola Square Mall,
3831 West Vine St., Ste. 60,
Kissimmee, FL 34741; John Rosser,
(407) 944-4913; email: john@craft-
worldflorida.com; website: craft-
worldflorida.com



Means R/C Raceway, 150 Pondell
Rd., North Fort Myers, FL 33903;
Pete Gonzalez, (941) 772-2251;
email: jamewootton@worldnet.net;
website: http://members.xoom.com/wootj



Monster Hobbies, 616 Southeast
10th St., Deerfield Beach, FL 33441;
(954) 428-9118



**Morris Kohl's Raceway and Hobby
Shop**, 1202 W. Waters Ave.,
Tampa, FL 33604; Morris Kohl,
(813) 931-1626



My Rose, 1695 W. Indiantown Rd.,
Jupiter, FL 33458;
Mark Watson, (561) 744-3800



NORRA, 3300 Santa Barbara Blvd., Naples, FL 34104; Dan Rodriguez, (941) 352-9021



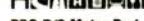
Ocala Radio Controlled Car Club, P.O. Box 70166, 2610 SE 8th St., Ocala, FL 34470; Bonita Hansley, (800) 324-8882, ext. 250; email: staff@ORCCC.org, website: www.ORCCC.org



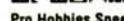
Paradise Speedway, Mile Marker 98 1/2 U.S. 1, P.O. Box 738, Key Largo, FL 33037; Joe Ravard, (305) 451-3707



Paul's Stadium Raceway, 4511 W. Dr. M.L. King Jr. Blvd., Tampa, FL 33614; Paul Surette, (813) 872-8662



PBG R/C Motor Park, 6351 Barbara St., Palm Beach Gardens, FL 33418; Doug Gleason, (561) 743-9791 or Tim Case, (561) 627-2608



Pro Hobbies Speedway, 715 N. Lake Pleasant Rd., Apopka, FL 32712; (407) 886-4615



Port St. Lucie Racing, 3626 SW Riveria St., Port St. Lucie, FL 34953; Frank Spadavecchia, (561) 336-8711



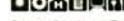
Randy's RC Raceway, 7744 Glenwood St., Clermont, FL 34711; Randy Zimmer, (352) 242-0557



River City R/C Car Club, 9711 Shoring Cross Dr., Jacksonville, FL 32257; Bill Fraden, (904) 268-1948



Sea Coast Watercraft and Hobby, 3119 Barrancas Ave., Pensacola, FL 32507; Vic Lakatos, (850) 457-1493



South Daytona R/C Raceway, 2121 S. Ridgewood Ave., South Daytona, FL 32119; Mike Bean, (904) 426-6481



South Palm Beach Racers, South County Regional Park, West Boca Raton, FL 33486; Mike Fazio, (561) 338-5367



Superior Hobbies R/C Parking Lot Racing, 430 E. Hwy. 436, Ste. #106, Casselberry, FL 32707; Rob Michael, (407) 834-9299



Tampa Bay R/C Club, P.O. Box 10224, St. Petersburg, FL 33733; Dick Gillette, (813) 526-0744



Tampa Hobbytown R/C 4 Slot Car Raceway, 15702 N. Dale Mabry, Tampa, FL 33618; Max and Judy Rosenroth, (813) 968-7233



Tropical R/C Raceway, Tropical Park, Miami, FL 33155; Pat Butler, (305) 772-4122



University RC Speedway, 8475 Cooper Creek Blvd., Ft. Lauderdale, FL 34201; Mike Boylan, (941) 358-7047



Warehouse Hobbies, U.S. Rt. 27 South, Winterset Motel, Sebring, FL 33872; Tony and Pam Castranova, (941) 699-1231

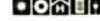


GEORGIA

Anthony's Victory Lane, 129 East Hwy. 80, Pooler, GA 31322; Anna Stephens, (912) 748-0847



Bullet Raceway and Hobby, 3735 Old Flowery Branch Rd., Oakwood, GA 30566; Mark Taaffe, (770) 534-9229



Dalton Raceway, 3036 Parquet Rd., Dalton, GA 30720; (706) 226-6699



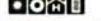
Echeconne Super Speedway, 2149 Richardson Dr., Macon, GA 31206; Andy Thompson or Cliff Kline, (912) 788-8731



Emerald City R.C. Speedway, Highway 40 East, East Dublin, GA 31021; Terry Cook, (912) 272-3856



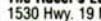
The Flight Box Hobby Shop, 3134-C Rockmart Rd., S.E., Rome, GA, 30161-6826; Leslie Duke, (706) 234-3014



Hobby Town Raceway, 2301 Airport Thruway, Columbus, GA 31904; Frank Bastos, (706) 660-1793



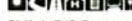
Lake Mayer Raceway, 1430 Dale Dr., Savannah, GA 31406; (912) 598-9709



The Racer's Edge, 1530 Hwy. 19 N., Thomaston, GA 30286; Roger or Mark Walls



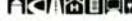
Sandy Cross Speedway, Rt. 1, Box 1071, Hwy. 51, Royston, GA 30662; Morris Phillips or Wayne Fowler, (706) 245-9573



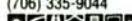
Shiloh R/C Raceway, 6362 Shiloh Rd., Hahira, GA 31632; Doug Burnett, (912) 794-2507



Silver Wings Raceway, 5611 Riverdale Rd., College Park, GA 30349; M. Bradshaw, (770) 991-2225



Stinger RC Super Speedway, 3769 Maysville, Rd., Commerce, GA 30529; Deric Stiles, (706) 335-5006 or (706) 335-9044



Sugar Bowl R/C Speedway, 5272 Nelson Brogdon Blvd., Sugar Hill, GA 30518; Shelley Bailey, (770) 945-6709



HAWAII

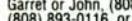
Garden Isle R/C Racers, 5855 Ahakea St., Kappa Kauai, HI 96746; Arnold Morales, (808) 823-0856



Kakaako Water Front Park Dragway, 98-029 Hekaha St., Bay #32, Alea, HI 96701; James Inkoy, (808) 487-5155



Maui R/C Racing Association, 230 Hana Hwy., Unit 11, Kahului, HI 96732; Garret or John, (808) 873-0376; (808) 893-0116, or (888) 646-6687



Pearl City Raceway, 98-029 Hekaha St., Bay 32, Alea, HI 96701; James Inkoy, (808) 487-5155



Radio Control Hawaii, 474 Kalanikoa St., S-104, Hilo, HI 96720; Glenn Shiroma, (808) 935-5629



Team PRC Racing Club, 176 Mamo St., Hilo, HI 96720; Charlie Kawamoto, (808) 935-3561



IDAHO

Almosta Ranch Speedway, 1732 Eldridge Ave., Twin Falls, ID 83301; Casey Clements, (208) 733-8219



Capital Dirt Burners, 1612 Latah, Boise, ID 83705; Jim Small, (208) 433-1631



Dirt Stuff Plus, 5344 N. Yellowstone Hwy., Idaho Falls, ID 83401; Brian Krah, (208) 522-7576



ILLINOIS

Adams R/C Raceway, 7201 S. Adams, Bartonsville, IL 61607; Ray Tigue, (309) 633-9300



AJ's Raceway & Hobby, 10211 Keslinger Rd., DeKalb, IL 60115; A.J. Schultz, (815) 756-2772



C.I.R.C.A., 905 Bibbs St., Jacksonville, IL 62650; Sport 'n Hobby, (217) 245-1375



C&R Hobbies, 39 E. Jones, Mifflord, IL 60953; Ray Craighead, (815) 889-4073



Depot Hobby Raceway, 180 S. Seminary St., Galesburg, IL 61401; (309) 342-9323



H & H Hobbies and Raceway, 9346 Virginia Rd., Lake in the Hills, IL 60102; Mike Hollingsworth, (847) 458-1777



Hans' RC Race Place, 2051 2100th St., Atlanta, GA 31123; Hans Bishop, (217) 648-2915



HobbyTown Raceway, 2103 N. Veterans Pkwy., Bloomington, IL 61701; Gary Prittis, (309) 664-4451



Leisure Hours R/C Raceway, 24121 W. Theodore, Blvd. 1, Plainfield, IL 60544; Scott Hill, (815) 439-1777 (track), (815) 439-1477 (shop)



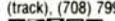
Machesney Park, 1220 Shappert Dr., Machesney Park, IL 61115; (815) 282-1311



Marty's R/C Hobby, 1335 E. Broadway, Bradley, IL 60915; Gail or Marty, (815) 933-8441



Monee R/C Raceway, 26049 Ridgeland Ave., Monee, IL 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597 (office)



Outlaw R/C Speedway, 1614 Broadway, Mattoon, IL 61938; (217) 234-6229



Pontoon Raceway, 3670 St. Rte. 111, Granite City, IL 62040-4304; Pat or Skip, (618) 931-1206



Quad Cities Radio Raceway, 541 1st Ave. North, Silvis, IL 61282; Tom Bedwell, (309) 751-9663



Radio-Active Raceway, 751 N. Bolingbrook Dr., #15, Bolingbrook, IL 60440; Jim, (630) 759-7557



Rector's R/C Raceway, RR 3, Box 104, Albion, IL 62806; Tim Wolfe, (618) 842-9379 (M-F), (618) 446-3288 (Sun.)



RMR Raceways, 19091 West Casey Rd., Libertyville, IL 60048; Ron Rawald, (847) 549-6963



Shiloh Eagles Superspeedway, 308 N. Virginia Ave., Belleville, IL 62220; (618) 277-6030



SIRCAR Raceway, 1200 N. Marion, Carbondale, IL 62901; (618) 549-5885



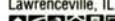
Stanton Hobby Shop, 4718 N. Milwaukee, Chicago, IL 60630; Kevin Kane, (773) 283-6446



Valley Farms R/C Raceway, 706 Bypass 20, Cherry Valley, IL 61016; Dean or Debbie, (815) 332-4516 or (815) 547-5984

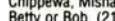


Wep Speedway, RR #2, Box 44, Lawrenceville, IL 62439; Bill Poe



INDIANA

BD R/C Off-Road Racing, 13255 Chippewa, Mishawaka, IN 46545; Betty or Bob, (219) 257-1098; 02kie@aol.com; www.angelfire.com/in/bdrcoffroad/index.html



Bremen Racing Ent., 308 N. Bowen, Bremen, IN 46506; Dale Heuberger, (219) 546-3807



The Dirt Yard, 1117 W. Epler Ave., Indianapolis, IN 46217; Keith Dudas, (317) 786-6417



Wild Bill's Raceway, 1651 W. Franklin St., Elkhart, IN 46516; Pete Russell, (219) 293-1827



GM Raceway, 1651 W. Franklin St., Elkhart, IN 46516; Pete Russell, (219) 293-1827



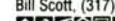
Hardesty R/C Raceway, 11 East Plymouth St., Hamlet, IN 46532; Max Hardesty, (219) 867-8600 or (219) 772-6566



Hobby Barn Raceway, 1950 Springhill, Terre Haute, IN 47082-9694; (812) 299-5773



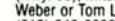
Hobbytown U.S.A., 5385 E. 82nd St., Indianapolis, IN 46250; Bill Scott, (317) 845-4106



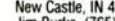
Nitro R/C Speedway, 4310 West 400 South, Danville, IN 46122; John Webber, (317) 539-4413; email: nitror1@aol.com



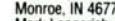
P&T Hobbiess and Raceway, RR 2 (Hwy. 60), Mitchell, IN 47446; Paul Weber or Tom Logsdon, (812) 849-6666; email: pthobby@bigfoot.com



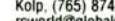
R/C Superdome and T.Q. Pro Shop, 14 E. Avenue, Hutchinson, KS 67501; Cody or Joe, (316) 665-6533



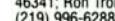
R/C World Raceway, 217 Brownie Ave., Scranton, KS 66537; John and Kyle, (913) 793-2313



RCRC Raceway, 507 N. 4th, Atwood, KS 67730; Bob Dunker, (913) 626-3261



R/C World of Indiana, 2246 West U.S. Hwy. 36, Lynn, IN 47355; Joe Kolp, (765) 874-2464; e-mail: rcworld@globalsite.net; web: www.RCWORLD.com



R/C Mania, 8 Wood Ct., Hebron, IN 46341; Ron Trobaugh, (219) 996-6288 (shop); (219) 762-5365



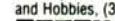
The Rink, 7900 Whitcomb, Merrillville, IN 46410; Don Reiner, (219) 769-8113



Showtime Lot Racing, 606 Lower Huntington Rd., Fort Wayne, IN 46815; Mike Romines, (219) 478-6099



Summit Area Radio Cars (SARC), 7000 Red Haw Dr., Fort Wayne, IN 46805; John Kissel, (219) 492-2271



Iowa
Deib's Speedway, 423 11th Ave. So., Clinton, IA 52732; Rusti's Miniatures and Hobbies, (319) 243-2697



Hobby Haven, 7672 Hickman Rd., Des Moines, IA 50322; Rick Marble, (515) 276-8785



IROAR—Hawkeye Downs Raceway, Hawkeye Downs, 6th St. S.W., Cedar Rapids, IA 52404; Dean Kleinschrodt, (319) 556-8524



Manly R/C Club, Box 23 (Hwy. 65), Manly, IA 50456; Bruce Hill, (515) 454-2025



Mr. Car Raceway, P.O. Box 1112, Central Iowa Fairgrounds, Marshalltown, IA 50158; Jim Gossett, (515) 483-2234



Outback Speedway, 403 State St., Guthrie Center, IA 50115; Helens Enterprises, (515) 747-3064



Radio Control Raceway Park, 2100 First Ave. N., Fort Dodge, IA 50501; Bernie Halverson, (515) 576-3780



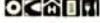
Riverside Raceway, Veteran's Park, Algona, IA 50511; Mike Beisch, (515) 295-9352



Shentona Speedway, 1117 W. Epler Ave., Indianapolis, IN 46217; Keith Dudas, (317) 786-6417

MAINE

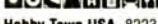
Clay Bowl R/C Hobbies, P.O. Box 61, Greene, ME 04236; Pat Cap., (207) 946-5003



R/C Speedway & Hobbies, 87 Main St., Fairfield, ME 04933; David Prescott, (207) 453-4588

**MARYLAND**

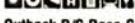
Doug's Raceway, 2935 Crain Hwy., Waldorf, MD 20601; Doug Moran Jr., (301) 843-6220



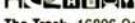
Hobby Town USA, 8223-11 Elliot Rd., Easton, MD 21601; Bill Dyke, (410) 820-9308



J.R.'s Race Place, 2935 Crain Hwy., Waldorf, MD 20601; James Radford, (410) 947-2766



Outback R/C Race Club, Maiden Ln., Manchester, MD 21102; Randy or Bonnie Henry, (410) 374-2878



The Track, 16806 Oakmont Ave., Gaithersburg, MD 20877; Mimi Wong, (301) 417-9630

**MASSACHUSETTS**

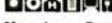
Boys Toys, 40 Father Davol Blvd., Fall River, MA 02721; (508) 677-9400



C&C Hobby & Raceway, 562 Russells Mills Rd. So, Dartmouth, MA 02748; Charlie, (508) 997-4131



Hi-Tech Hobbies, 1681 Broadway (Rt. 138), Raynham, MA 02767; Ruben, (508) 880-5373



Megadrome Raceway, Rt. 8, Curran Hwy., North Adams, MA 01247; Bob Blanchette, (413) 743-7223



Northboro Speedway, 168 Main St., Rte. 20, Northboro, MA 01532; Bob Trimble, (508) 393-8087

**MICHIGAN**

D.R. R/C, 22789 Northline Rd., Taylor, MI 48180; Bobby or Fred, (734) 287-7405



Freedom Hill R/C Raceway, 35372, Wellston, Sterling Heights, MI 48312; Jim McKenna, (810) 268-3996



Great Lakes R/C Racer's Club, 632 Plymouth Ave. NE, Grand Rapids, MI 49505; (616) 948-9798 or (616) 948-9814; email: Gr8LksRacers@aol.com, www.members@aol.com/gr8lksrcw/index.html



Hobby Hub, 5859 M99, Diamonddale, MI 48821; Verne Goebel, (517) 337-9278 or (517) 351-5843



Jon's Hobby, 4739 E. Pickard, Mt. Pleasant, MI 48858; Jon Beutler, (517) 773-5412



JT Superspeedway, W. Golden Ave., Battle Creek, MI 49015; Jerry or Sam, (616) 965-0116



Larry's Performance R/Cs, 43665 Utica Rd., Sterling Heights, MI 48314; Larry, (810) 997-4840



Lazer RC Speedway, 2858 N. Wilmot Hw., Adrian, MI 49221; Russ Johnson, (517) 263-2806



Motor City Speedway, 1602523, mile Rd., Macomb Township, MI 48042; Gary Cornwell, (810) 677-2470



N.M.R.C.C. Raceway, Hobby Toy, Main St., Gaylord, MI 49735; Ed Schneider, (517) 732-3963



Ovait's R/C Speedshop, 3920 N. U.S. 31 S., Traverse City, MI 49684; Jim Ovait, (616) 947-6670



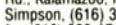
R.A.C.E. Inc., 3227 Mathews, Jackson, MI 49203; Sam Sprang, (517) 787-9161



Raw Roots Race Tracks, 14623 East Croswell, 1/4 mile north on 152nd (off U.S. 31), West Olive, MI 49460; Roy Benningk, (616) 399-9338



R&L Hobbies & Racing, 9782 Portage Rd., Kalamazoo, MI 49002; Rex Simpson, (616) 323-3686; fax (616) 329-1744



Rodgers R/C Raceway, 7463 Ridge Rd., Britton, MI 49229; George Rodgers, (517) 451-8301



Superior R/C Raceway, 160 S. County Road 553, Lot 173, Grawn, MI 49841; Frank Felster, (906) 346-7225



Thumb Raceway, 3441 Main St., Marlette, MI 48453; Jim Wilson, (517) 635-7848



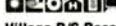
Vicksburg Off-Road R/C Raceway, 50201 Silver St., Vicksburg, MI 49097; Tim, (616) 323-7963



T.J.'s RC Raceway, Rt. 2, Box 22C, Luther, MI 49656; Tod Smart, (616) 797-8035



Village Hobbies-n-Crafts, 195 N. Elm, Hesperia, MI 49421; Alan or Fran, (616) 854-1374



Village R/C Raceway, Prairie Ronde St., Decatur, MI 49045; Chuck Nolke, (616) 423-7878



Washtenaw R/C Raceway, Ypsilanti, MI 48198; Jim Rousseau, (734) 395-5048



Willis Outdoor R/C Racetrack, 13922 Oakville-Waltz Rd., Willis, MI 48191; Mike Higgins, (734) 587-2012

**MINNESOTA**

Bemidji R/C, 1015 Miles Ave. S.E., Bemidji, MN 56601; Russ or Ryan, (218) 751-1629



Car Town USA, 2822 Piedmont Ave., Duluth, MN 55811; Roger Deloach, (218) 727-6248



Central RC, 1620 Central Ave., Minneapolis, MN 55330; Doug Ringold, (612) 781-1640



Country R/C Raceway Park, 24214 325th St., Belview, MN 56214-8115; Charles L. Steffl, (507) 641-8115



Duey's Hobbies & R/C Raceway, 6600 Cahill Ave., Inner Grove Heights, MN 55076; Duey Carlson, (612) 450-1721



Grand Rapids R/C Speedway, 2209 Hwy. 2 East, Grand Rapids, MN 55744; Aaron Voges, (218) 326-6751



Granite City R/C Speedway, 3555 Shadowwood Dr. N.E., East Hwy. 23, Sauk Rapids, MN 56379; Brett Donahue, (320) 251-6980



J's Radio Control Race Park, 22994 290th Ave., Starbuck, MN 56381; Jay Campbell, (320) 239-4827



Kevin's Private Off-Road Raceway, 702 So. Washington Ave., Crookston, MN 56716-2137; Kevin Altepet, (218) 281-7491; email: kevnles@crookston.polarisrl.net; www.kevnsrcc.bizonthe.net (note: registration required for permission of use)



Northwoods Hobby Raceway, 2638 Hwy. 25 North, Brainerd, MN 56401; Tom Grogg, (218) 829-9257



Ray's Raceway Park, 105 3rd Ave. NE, Glenwood, MN 56334; Dan Winter, (320) 634-5246



R/C Racing World, 235 Main Ave. North, Harmony, MN 55939; Mark McKay, (507) 886-5931 or (507) 886-2224



Red Barn RC Raceway, Rt. 4, Box 333, Mankato, MN 56001; Rusty Weiss, (507) 345-8972



Southside Speedway, 2241 Marion Rd. SE, Rochester, MN 55904; Kevin Guy, (507) 281-3233



Time R/C Raceway, 20 West Lake St., Chisholm, MN 55719; RV, (218) 254-4321

**MISSISSIPPI**

Joe McFadden Hobbies, 5531 Fox Meadow Dr., Meridian, MS 39307; Joe McFadden, (601) 483-7000



Small Cars Unlimited, 820 Cooper Rd., Jackson, MS 39212; (601) 372-FAST; www.smallcarsunlimited.com

**MISSOURI**

All Seasons Hobby, 29 O'Fallon Square, O'Fallon, MO 63366; Bob Daniels, (314) 281-8767



B&L Hobbies & Raceway, 2800 Anchor Dr., Park Hills, MO 63061; Bob Marler, (573) 431-9444



Fire Mountain Raceway, 8647 Commercial Blvd., Pevely, MO 63070; Dan Gordon, (314) 475-6449



GreenTree R/C Racepark, St. Louis Dirt Burners R/C Club, Marshall Rd., Kirkwood, MO; (314) 831-2194



Hobbies 'N Stuff Raceway, 204 Mall Pkwy., Wentzville, MO 63385; Tim Satchwill or Crandall Olds, (314) 327-6006



North Missouri Raceway, 223 Graves St., Chillicothe, MO 64601; Billy Johnston, (660) 646-1120



Ozark Mountain Speedway, Rt. #2, Box 50, H-Highway and County Rd. 31, Noel, MO 64854; Clayton Younker, (417) 475-6222



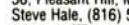
Ozarks R/C Raceway, Hwy 13N, Brighton, MO 65781; Gene Rhodes or Ron Hawkins, (417) 742-4376 or (417) 742-7223



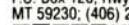
Real Blue Vue Speedway, 12019 E. 47th St., Kansas City, MO 64133; Mark Randolph, (816) 358-0238



Real R/C Raceway, 24204 State St. 58, Pleasant Hill, MO 64080; Steve Hale, (816) 540-5584

**MONTANA**

Stormer Raceway & Slot Motorplex, P.O. Box 126, Hwy. 2 East, Glasgow, MT 59320; (406) 228-4569



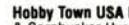
Checkerboard Raceways, P.O. Box 240, Elwood, NJ 08217; Ray Murray, (609) 629-4809



Family Hobbies Raceway, 3576 N.W. Blvd. & Weymouth Rd., Vineland, NJ 08360; Linda Vogel, (609) 696-5790



Jackson R/C Racing, P.O. Box 565, Christopher Columbus Blvd., Jackson, NJ 08527; Al Sodano, (732) 364-6422, Ed. (732) 928-8963



Hobby Town USA Raceway, N. 1st St. & Cornhusker Hwy., Lincoln, NE 68508; Ben Smith, (402) 434-5056



Hobby Town USA Raceway, N. 1st St. & Cornhusker Hwy., Lincoln, NE 68508; Ben Smith, (402) 434-5056

**NEBRASKA**

Goodyear Speedway and Off-Road, 4021 North 56th, Lincoln, NE 68510; Tom or Bob, (402) 464-5172

Hadar R/C Raceway, 55192 849th Rd., Norfolk, NE 68701; John Schoenauer, (402) 644-7922

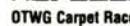
Hobby Town USA Raceway, N. 1st St. & Cornhusker Hwy., Lincoln, NE 68508; Ben Smith, (402) 434-5056

NEBRASKA

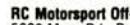
Mr. Bill's, 450 West 2nd St., Hastings, NE 68901; Bill J. Ries, (402) 462-4865



O.N.R.O.A.D., 3307 N. 58 St., Omaha, NE 68104; Cook Jacobs, (402) 486-8744



OTWG Carpen Raceway, 55129 849th Rd., Norfolk, NE 68701; John Schoenauer, (402) 644-7922



RC Motorsport Off-Road Raceway, 5600 Mass Rd., Papillion (Omaha), NE 68133; Marty Stepanek, (402) 593-6133



Salvation Army South Corps, 4032 Harrison St., Omaha, NE 68164; (402) 734-3414; fax (402) 734-3415



T & T Raceway, 476 26th Ave., Columbus, NE 68601; Tom, (402) 564-9216



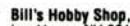
The Speed Zone, 1524 Atokad Dr., Sioux City, NE 68776; Rob Murdoch, (712) 428-4679, or Jim Carson, (712) 274-7731



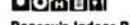
Wacha's R.C. Speedway, 1823 23rd St., Columbus, NE 68601; Tom, (402) 564-9216



The Speed Zone, 1524 Atokad Dr., Sioux City, NE 68776; Rob Murdoch, (712) 428-4679, or Jim Carson, (712) 274-7731



Bill's Hobby Shop, 1000 N. Nellis Blvd., Las Vegas, NV 89110; Bill Schultz, (702) 531-3282; website: www.billsbobbyshop.com



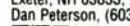
Dansey's Indoor R/C & Hobbies, 741 N. Nellis, Las Vegas, NV; David Lugo, (702) 453-RACE, (888) 675-8963; www.danseys.com



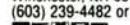
Lizard Raceway, P.O. Box 1248, Verdi, NV 89439; Jeff Griffin, (702) 345-6573



Axis Racing R/C Dragway, 4197 High St., Exeter, NH 03833; Dan Peterson, (603) 659-4877



Emergency R/C Speedway, 4 Maple St., Winchester, NH 03470; Harold Thomas, (603) 239-4482 or 239-6470



North Haverhill R/C Racing, Main St., Haverhill, NH 03774; Shelly White, 111 Golf Links Rd., Wells River, VT 05081; Todd White, (802) 757-2579



Robert's Railroad & Hobbies, 1335 1st NH Turnpike—Rt. 4, Northwood, NH 03261; Robert M

Jerry's Raceway, 111 S. Applegate Rd., Ithaca, NY 14850. Jerry and Lori Achilles. (607) 277-0940.



LI 1/4-Scale Racers, 63 Horton Dr., Huntington Station, NY 11746. (516) 351-5384.



Long Island Raceway, 168 Broad Hollow, Farmingdale, NY 11735. James. (516) 845-7223. www.raceway.com



MTW Raceway, 11930 Johnny Cake Hill Rd., Cato, NY 13033. Wade. (888) 39-HOBBY.



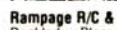
Performance Plus Radio Control Speedway/The Hobby House, 1141½ Jones & Gifford Ave., Jamestown, NY 14701. (716) 488-1772.



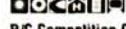
P.R.O. Speedway, 5 Washington St., Cattaraugus, NY 14719. Marc Pritchard. (716) 257-3101.



Radio Hill Raceway, 1219 Shannon Corners Rd., Dundee, NY 14837. Bill Brewer. (607) 243-8641 or Greg Areford. (607) 243-7899.



Rampage R/C & Hobbies, 782 Rt. 9G, Rockledge Plaza, Hyde Park, NY 12538. Brian Walker or Kevin Bobb. (914) 229-1379.



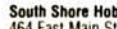
R/C Competition Corner, 2202 Brewerton Rd., Matthydale, NY 13211. Lori and Cos Cirriello. (315) 455-8718.



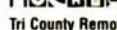
Silver State R/C Club, Centennial Park, Carson City, NV 89501. (702) 853-3953.



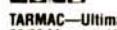
Southern Tier Raceway, 88 Paige St., Owego, NY 13827. Anita Harding. (607) 687-5395.



South Shore Hobby & Raceway, 464 East Main St., Patchogue, NY 11772. Benny or Bonnie. (516) 758-5567.



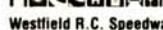
Tri County Remote Control Car Club, 33 West Decker St., Johnstown, NY 12095. Tom Levile. (518) 725-1279.



TARMAC—Ultimate R/C Raceways, 28/30 Mountain View Rd., Poughkeepsie, NY 12603. Todd. (914) 342-5409; Greg. (914) 528-5084; trackside. (914) 454-8276. www.tarmacracers.com



Walt's Hobby, 2 Dwight Park Dr., Syracuse, NY 13209. (315) 453-2291.



Westfield R.C. Speedway, 27 Clark St., Westfield, NY 14787. John or Jared Lindstrom. (716) 326-2399. 716-326-2309.



Whitestone, 30-56 Whitestone Expy. (Dept. of Motor Vehicles), Flushing, NY 11374. Rudolf Ardilla. (718) 966-6155.



Willis Hobbies R/C Speedway, 300 Willis Ave., Mineola, NY 11501. Ken Ford. (516) 746-3944.

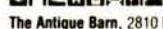


ZOAR Road Speedway, 15318 Armes Ct., Gowanda, NY 14070. David & Gordon Ackler. (716) 532-9463.

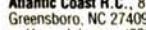


NORTH CAROLINA

A&J R/C Models, 2051 Anthony Rd., Burlington, NC 27215. Jerry Love or Andrea Thompson. (336) 227-4556; fax (910) 227-1001.



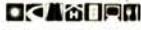
The Antique Barn, 2810 Forest Hills Rd., Wilson, NC 27893. (252) 237-6778.



Atlantic Coast R.C., 8-A Lockhead Ct., Greensboro, NC 27409. Charlie Higgins or Harry Johnson. (336) 664-1277.



Badin Shore Raceway, 1730 Jackson Lake Rd., High Point, NC 27263. Jimmy or Tim Martin. fax (910) 431-6407.



C/C Hobby Speedway, 8358 U.S. Hwy 220 Bus. N., Randleman, NC 27317. Steve & Mary Cox. (910) 495-3482.



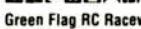
C/W R/C Speedway, 1297 Charlotte Hwy., Asheville, NC 28730. Billy or Tim. (828) 684-0061.



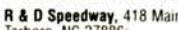
Carolina Dragway, 1555 Turkey Hwy., Clinton, NC 28328. (910) 592-9489.



Chatham R/C Raceway, 326 Reno Sharpe Store Rd., Bear Creek, NC 27207. Dwight Fields. (919) 898-2991.



Green Flag RC Raceway, 107 Harley Rd., Wilmington, NC 28401. Mike McLemore. (910) 452-1620.



R & D Speedway, 418 Main St., Tarboro, NC 27886. John Dupree. (919) 823-2294.



Ride & Slide R/C Raceway, 5319 Yadkin Rd., Fayetteville, NC 28303. Bill Culbertson. (910) 867-4202.



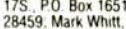
R.C.R. Speedway, 1415 Henderson Grove Church Rd., Salisbury, NC 28147. Ronnie Linker. (704) 637-2565.



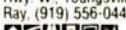
Rosewood R/C Speedway, 651 Community Dr., Goldsboro, NC 27530. Glenn Elam. (919) 731-4734.



Southern RC Motorsports Club, Hwy 17S, P.O. Box 1651, Shallotte, NC 28459. Mark Whitt. (910) 754-4902 or Eddie Ferster. (910) 754-8528.



Youngsville R/C Club, 6516 NC 96 Hwy. W., Youngsville, NC 27596. James Ray. (919) 556-0446.



NORTH DAKOTA

Northern Mini Racers, 1000 36th St. S.E., Minot, ND 58702. Mike. (701) 838-5818.



River City R/C, 2714 Main Ave., Fargo, ND 58103. Chris Hughes. (701) 235-1272.



OHIO

AK Hobby and Raceway, 3826 North Bend, Cincinnati, OH 45211. Tim Tolle. (513) 661-7080.



American Ohio Sprint Car, 1708 Empire Rd., Wickliffe, OH 44092. Gary Waldheim. (440) 944-9966.



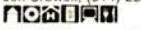
Classic Hobbies, 1994 E. Waterloo Rd., Akron, OH 44312. Walt Ellis. (330) 733-6400.



CORCAR/ Sams Club, 128 Amity Rd., Galloway, OH 43119-8732. Bill Stevenson. (614) 870-7159.



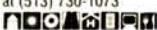
Columbus R/C Racing Club, (C.R.C.R.C.), Franklin County Fairgrounds, Hilliard, OH 43026. Jeff Crowell. (614) 236-1783.



D&J R/C Raceway, 801 W. Market St., Orrville, OH 44667. Don Yoder or Mark Nussbaum. (330) 682-4266.



Full Throttle Raceway, 600 Mt. Moriah Dr., Cincinnati, OH 45255. Bill Dolch. (513) 943-9009 or via pager at (513) 730-1073.



Glass City Radio Control, 2620 Ivy Pl., Toledo, OH 43613. Frank Johnson. (419) 472-1286.



Greentown R/C Raceway, 3353 Perrydale, Greentown, OH 44630. Chuck Lambert. (330) 364-6585.



Hobby Shop Raceway, 2096 Miamisburg Centerville Rd., Centerville, OH 45459. The Hobby Shop. (937) 436-6161.



Hoopy World, 3499 SR 59, Ravenna, OH 44266. Tom Fry. fax (330) 296-0894.



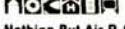
J & L R/C Raceway, 5342 W. St. Rt. 718, Troy, OH 45373. Mike Wegman. (513) 521-3408; email: wegms@one.net



Lafferty R/C Raceway, Box 153, 70228 Hurrah St., Lafferty, OH 43951. Chris Christman. (740) 968-4818.



Mid American Raceway, 13150 Airport Hwy., Swanton, OH 43558. Bill or Chuck. (419) 475-9459.



Nothing But R.C. Track, 34632 True Rd., Logan, OH 43138. Gary Lloyd. (740) 385-0288.



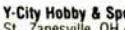
Shiray's Hobby & RC Raceway, 19930 State Route 117, Waynesfield, OH 45896. Fay Zimmerman. (419) 568-8055.



TARCAR, 7216 Nebraska Ave., Toledo, OH 43617. Bill Bridges. (419) 826-3859.



Van Wert R/C Raceway, 144 E. Main St. (above Hoverman Music), Van Wert, OH 45891. Mark Davis. (419) 232-2112.



Y-City Hobby & Speedway, 120 S. 6th St., Zanesville, OH 43701. Kevin McKenna. (614) 455-3025.



OKLAHOMA

Adams Creek R/C Speedway, 5207 S. 19th E. Ave., Broken Arrow, OK 74014. John Beighle. (918) 355-1416.



Competition R/C, 100 S.E. 89th, Oklahoma City, OK 73149. James or Louise Brown. (405) 634-0809.



Enid R/C Speedway, 1821 S. Van Buren Hwy (W1 Hwy 1), Enid, OK 73701. Bob. (580) 233-3444 or (580) 234-7666.



R/C Speedway of Lawton, 202 Southeast B Ave., Lawton, OK 73501. Rick. (580) 355-8040.



Wild Country Speedway, 127 S. Main, Porter, OK 74454; Charles McCollough. (918) 685-0372 or (918) 687-1686.

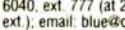


OREGON

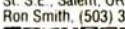
Competition Racing Association, 17941 N.E. Gleason, Portland, OR 97230. Mark Taylor. (503) 761-1334.



D.I.R.T. R.O.A.D. Club, 65540 73rd St. Bend, OR 97701. Daleyne and Edward Gletz. (541) 388-2932 or (800) 475-6040, ext. 777 (at 2nd dial tone, enter ext.), email: blue@coinet.com



R/C Plus Hobbies Raceway, 1857 25th St. S.E., Salem, OR 97302. Ron Smith. (503) 364-9188.



R/C Speed Center, 2810 N. Pacific Hwy., Medford, OR 97501; Gene and Betty Jean Skelton. (541) 779-2928.



Rose City Scale Racing, Highway 224, K-Mart parking lot, Milwaukee, OR 97222. Rick Strauss. (503) 631-2929.



Yamhill County R/C Club, 722 Morgan Ln., McMinnville, OR 97128. Larry Rucker. (503) 472-7234.



Glass City Radio Control, 2620 Ivy Pl., Toledo, OH 43613. Frank Johnson. (419) 472-1286.

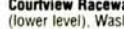


PENNSYLVANIA

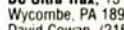
B&B Raceway, 1301 Pine St., Berwick, PA 18603. Ray Berry Jr. (570) 759-3469.



Courtview Raceway, 20 S. Main Street (lower level), Washington, PA 15301. Aaron Stimmell Jr. (724) 225-4302.



DC Ultra Trax, 13 York Rd., Wycombe, PA 18974. David Cowan. (215) 672-5200.



D&D Hobby Shop, 305 3rd St., Rouseville, PA 16344. (814) 676-4475.



Dreamboat Hobbies, 2810 Pennsylvania Ave. W., Warren, PA 16365. George Verbocht. (814) 733-8052.



Koontz's Home & Hobby Center, 1205 Hoover St., Pittsburgh, PA 15204. (412) 331-3866.



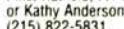
Kranzel's R/C Raceway & Hobbies, 4115-B Bosler Ave., Lemoyne, PA 17043. David or Stuart Kranzel. (717) 737-7223.



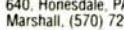
Little Plum R/C Hobbies, RR 1, Box 330, Lock Haven, PA 17745. Larry Duck. (570) 769-1984.



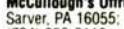
Lugnut Raceway, 1713 Bethlehem Pike, Hatfield, PA 19440. Bill Henning or Kathy Anderson. (215) 822-5831.



Marshall's R/C Raceway, RR 4, Box 415-B Bosler Ave., Lemoyne, PA 17043. David or Stuart Kranzel. (717) 737-7223.



McCollough's Offroad, 108 Callen Rd., Sarver, PA 16055. Doug McCollough. (724) 352-0116; email: McColl23@apc.com



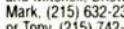
Hacienda Muñoz R/C Track, Carr. #14, Juana Diaz, PR 00795. (809) 837-7083.



Hi-Speed C Raceways, 422 San Claudio Ave., San Juan, PR 00926. Carlos Ortiz. (787) 283-0198.

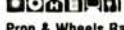


Isabela R/C Track, 390 Sur Guayanabo, PR 00969. Fernando Salcedo or Albaro Obregon. (787) 720-1176.

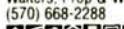


Rhode Island

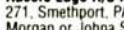
Tri-State R/C Raceway, 205 Hallene Rd., Warwick, RI 02886. Raymond Dean. (401) 738-4908.



Atlantic World of Hobbies, 2458 Remount Rd., North Charleston, SC 29406. Jimmy Closson. (843) 554-3546.



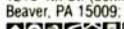
Bethany Motor Speedway, 959 Wilmohr Rd., Clover, SC 29710. Eddie Spearman. (803) 222-4758.



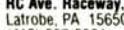
Carolina R/C Speedway, 4148 Calhoun Memorial Hwy., Easley, SC 29640. Craig Prahl. (864) 295-1209; www.carolinarc.com



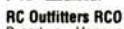
Darlington R/C Raceway, Hobbies & More, 1570 S. Main St., Darlington, SC 29532.



Extreme R/C Raceway, 5976 Grace Ln., Myrtle Beach, SC 29577. Kevin Bullock. (803) 236-2083.



The Growing Racing Center, 939 S. Anderson Rd., Rock Hill, SC 29730. Mike Durham or Don Faris. (843) 327-4121.



Hobbies and More, 1570 S. Main St., Darlington, SC 29532; Jerry Pollard. (803) 393-0355.



J&M R/C Hobbies, 5341 Dorchester Rd., Evanston Plaza, N. Charleston, SC 29418; Mike Smith, (803) 552-9449



ORA Atomic Racing Facility, 373 Boyd Pond Rd, Aiken, SC 29803; Bill Jackson, (706) 855-0846 or (803) 642-0314



The Racing Connection, 4375 Juniper Bay Rd., Conway, SC 29527-4129; Dave Hamilton, (843) 397-0124



SkateLand USA, 202 Hwy. 29, Anderson, SC 29621; Jon Fulmer, (864) 225-1840; touring cars only on asphalt and oval



SOUTH DAKOTA

Action R/C Raceway, 107 N. Main, Mitchell, SD 57301; (605) 996-6895



Boomerang Raceway, 105 N. Main, Hartford, SD 57033; Ed Smithback, (605) 528-7345



Dakota Off-Road Racers, 2989 W. Br. Co. 12, Aberdeen, SD 57401; (605) 226-0604



Goldtrax Raceway, 409 E. High, Lead, SD 57754; Steve Brown, (605) 584-2355



Tri-State R/C Club, Sioux Empire Fair Grounds, Sioux Falls, SD 57105; Chad Walth, (605) 357-9654; email: losiman@email.msn.com

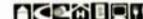


R/C Action Raceway, SE Corner at 484th & Hwy. 38, Sioux Falls, SD 57105; Brian Cox, (605) 373-0511



TENNESSEE

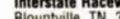
D&M's Downtown Raceway, 2703 U.S. Hwy. 411S, Maryville, TN 37303; (423) 681-8919



Futrell's R/C Hobby Shop, 1715 Jackson Ave., Seymour, TN 37865; Dan Futrell, (423) 908-9526



Hobby Town USA, 2000 Mallory Ln., Franklin, TN 37067; Bobby Mills, (615) 771-7441



Interstate Raceway, 5237 Highway 126, Blountville, TN 37617; Dale or Mark, (423) 323-1513; mktarnz@intermediatenet.net



Mid-South Racing Association, 9155 Hwy. 72 (Poplar Ave.), Germantown, TN 38138-7903; (901) 757-8774



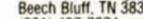
MSA Racing, 120 Villageway, Crossville, TN, 38555; D.R. Findley, (931) 456-0027



R & R Racing Portable Track, RR3, Box 34, Linden, TN 37096; Ross or Ron, (931) 589-5433



TNT Raceway, 643 Loop Hollow Rd., New Tazewell, TN 37825; Cliff Swett, (423) 869-8942



W.O.W. Raceway, 59 Luray Rd., Beach Bluff, TN 38313; Kelly Bean, (901) 427-7874; email: windix60@pipeline.com



TEXAS

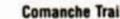
215 Speedway, 1814 County Rd. 215, Abilene, TX 79602; Clyde Gardner, (915) 673-2351



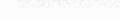
B&B R/C Hobbies, 700 East 4th, Big Spring, TX 79720; Walter Bumbulis, (915) 263-1790



Big Mike's R/C Raceway, 1405 W. Cotton St. (behind the Locker Room), Longview, TX 75604; (903) 297-7814



Comanche Trail RC Park, City Park, Big Spring, TX 79720; Allen Nichols, (915) 263-4241



Discount Hobbies, 1722A West Anderson Loop, Austin, TX 78757; Tony Bermudez, (512) 458-2324



Drycreek Raceway, 5903 Co. Rd. 2297, Quintana, TX 75474; Micky Alphin, (903) 883-4060



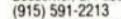
Eastex Raceway, 45000 Hwy. 59 N., New Caney, TX 77357; Brent Mahaffy, (713) 399-9777



Finish Line Raceway, 2775 N. Hwy. 360, Ste. 637, Grand Prairie, TX 75050; Steve Manning, (817) 652-3340



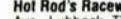
Hal's Hobby Raceway, 1440 Besserman, El Paso, TX 79936; (915) 591-2213



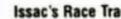
Hobbytown USA, 999 E. Basse Rd., Ste. 177, San Antonio, TX 78209; Joe Sera or Clark Baisdon, (210) 829-8697; fax (210) 829-8707



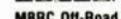
Hot Rod's Raceway, 4218 Boston Ave., Lubbock, TX 79413; Rodney, (806) 797-9964



Issac's Race Track, 18177 Gulf Fwy., Houston, TX 77598; Issac Ben-Ezra, (281) 488-8697



MBRC Off-Road Raceway, 204 D&E Valley Ln., Kennedale, TX 76060; Mike Battaille, (817) 563-1900



Mammoth R/C Racing, 4221 Spencer, Pasadenia, TX 77504; John, (713) 946-2522



Mike's Hobby Shop Superstore and Raceway, 1605 Crescent Cir., Carrollton, TX 75006; (972) 242-4930; www.mikeshobbyshop.com



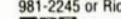
Performance Raceway, 1106C Witte Rd., Houston, TX 77055; Jorge Tabush or Terry Schmid, (713) 464-4458



Rev It Up Raceway Practice Track, 3076 Kellar Rd., Smithville, TX 78757; Rev, Alton T. Edwards, (512) 237-5903



Rick's R/C Raceway, 238 Scenic Loop, Boerne, TX 78000; Rick, (210) 981-2245 or Rich, (210) 590-1805



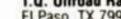
Star Car Raceway, 5802 Patton St., Corpus Christi, TX 78415; Glen Stead, (512) 949-8525; Race Hotline, (512) 881-6105



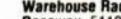
T&T Eagle, 3420 Ave. K., Suite 154, Plano, TX 75074; Joe Sullivan, (972) 633-2470



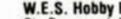
Texas Speedway, 67073 Chimney Rock, Bellaire, TX 77401; (713) 661-7137; www.i-hobby.com



T.O. Offroad Raceway, 6236 Quail, El Paso, TX 79924; Efrén Saenz, (915) 821-7522



Warehouse Radio Controlled Raceway, 5119 Plains Blvd., Amarillo, TX 79101; Craig or Darren Waddell, (806) 356-9080



W.E.S. Hobby Race, 980 S. Fourth St., Beaumont, TX 77701; Edmond Richards, (409) 839-4929



UTAH

Intermountain R/C Raceway, 8481 W. 2700 S., Magna, UT 84044; David Mott, (801) 250-8303



Hobby Haven Raceway, 450 W. Coal Creek, Cedar City, UT 84720; Ryan, (435) 586-7316



Payson R/C Raceway, 955 S. Main, Payson, UT 84651; Guy Wood, (801) 224-3852 and Lasca Wood, (801) 222-8677



Vision Hobby, 352 N. State St., Orem, UT 84057; Ken Rice, (801) 226-6226



WOR R/C Raceway, 3170 Brinker Ave., Ogden, UT 84401; Brian Worton, (801) 393-2530



VERMONT

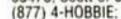
Barre Town R/C Club, 14 S. Main St., Wall St. Complex, Barre, VT 05641; Russ or Pete, (802) 888-2860 or (802) 476-9458



Bradford R/C Racing, Main St., Bradford, VT 05033; Seth Bean, (802) 222-9674



Empire Hobbies Off-Road Raceway, 272 North Main St., Saint Albans, VT 05478; Scott or Jen, (877) 4-HOBBIE; email: mpirhobie@Together.net



Shoughton Pond Raceway, Shoughton Pond Rd., Perkinsville, VT 05151; Rick Adams, (802) 263-9321

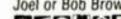


VIRGINIA

Brad's Hobbies, 1105 Greenville Ave., Staunton, VA 24401; Brad, (540) 885-3642



Brown Brothers Hobbies, 924 N. Main Street, Dumfries, VA 22026; Joel or Bob Brown, (703) 221-5746



Cooper's R/C Race Center, 4000 Sago Rd. (969), Chatham, VA 24531; Norris Cooper, (804) 724-7342 or (804) 724-4182; website: http://coopersrc.virtualweb.net



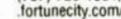
DRCW Raceway, Debbie's RC World, 2200 Commerce Pkwy., Virginia Beach, VA 23454; Les Modlin, (757) 340-6681



Gloucester Scale Hobbies, 2352 George Washington Memorial Hwy., Hayes Plaza, Hayes, VA 23072; Rob Thein, (804) 642-3484



Hampton RC Speedway, 1920 E. Pembroke Ave., Hampton, VA 23663; Steve Long or Mickey Kern, (757) 723-1884; website: www.fortunecity.com/olympia/norman/26/



K & W Hobby & Sports, 5186 Nine Mile Rd., Richmond, VA 23223; Ross Martin, (804) 737-3904



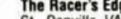
KC's Radio Control & Repair, Rt. 4, Box 312, Trenton Ferry Rd., Lynchburg, VA 24503; Curtis or Kim Wright, (804) 384-8596



Ultimate R/C Raceway, 907 Cole St. #3, Enumclaw, WA 98022; Dan Daugherty, (360) 802-2388



West Coast Hobby & Raceway, 2239 Stevens Dr., Richland, WA 99352; Darren Shank, (509) 375-4995



Zep's Hobbies & Raceway, 530 Interlake, Moses Lake, WA 98837; Steve Ralph, (509) 765-8191



The Tilt Yard, 6994 Tilt Yard Dr., Dayton, VA 22821; (540) 828-3476; www.tiltyard.com; ttiltyard@rca.net



Trainline R/C Racing, 5661 Shoulders Hill Rd., Suffolk, VA 23435; Frank Stevens, (757) 488-5454



WASHINGTON

A-Main Raceway, 14011 N.E. 3rd Ct., Vancouver, WA 98685; Monty Coleman, (360) 571-8404



Bear Creek Raceway, 6319 Maltby Rd., Woodinville, WA 98072; Nathan Brockway, (425) 398-0140



Burien Toyota R/C, 15025 1st Ave. South, Seattle, WA 98148; Ray Meek, (800) 854-6456



Cedaredge Raceway, 1673 Cedaredge Rd., Mount Vernon, WA 98273; Joe Madonna, (360) 659-0072; email: getchell@ucomy.com



Fantasy World Raceway, 7901 S. Hosmer, Tacoma, WA 98408; Dave Kleinman, (253) 473-6223; www.fantasyworldhobbies.com



Four Seasons R/C Racing, 2941 Sleater Kinney Rd. N.E., Olympia, WA 98506; Gary and Sharon Brown, (360) 491-2430



Hank Perry Raceway, 1901 N. Sullivan Rd., Spokane, WA 99209; Nathan Mullins, (509) 928-2009; (800) 854-8884



Race City, 125 E. Main St., Auburn, WA 98002; Craig Haslebacher, (253) 939-2515; trackside (253) 939-



SARCAR Club, 700 Renton Village Pl., Renton, WA, Darylene Denison, (425) 483-8210



Spokane Indoor Raceway, 6422 E. 2nd Ave., Spokane, WA 99212; Dave Mapston, (509) 534-RACE



Tacoma R/C Raceway, 6305 6th Ave., Tacoma, WA 98406; Scott Brown, (253) 565-1935



Rain City RC Raceway, 3616 South Rd. Suite A-3, Mukilteo, WA 98275; Peter, Andrew or Debbie, (425) 438-2454; ibauser@gte.net; www.raincityraceway.com



Ultimate R/C Raceway, 907 Cole St. #3, Enumclaw, WA 98022; Dan Daugherty, (360) 802-2388



West Coast Hobby & Raceway, 2239 Stevens Dr., Richland, WA 99352; Darren Shank, (509) 375-4995



Zep's Hobbies & Raceway, 530 Interlake, Moses Lake, WA 98837; Steve Ralph, (509) 765-8191



WEST VIRGINIA

Burr-Fab Raceway, 90 Davis St., West Union, WV 26456; Mark Travis, (304) 873-2487



Fulton's R/C Raceway, 2646 Chapline St., Wheeling, WV 26003; James Fulton, (304) 233-5355



Left Turn Hobbies, 100 Saco Ln. (by Post Office), Glen White, WV 25849; Stretch, (304) 255-3930



Race Zone, Hopewell Rd., Rt. 8, Box 343A, Fairmont, WV 26554; Joe Clutter, (304) 368-1000



Shamrock Raceway, 106 Cheviot Pl., Stephens City, VA 22655; Scott Janow, (540) 869-6051; note: track is located in Winchester, VA



Thunder Road RC Racing, P.O. Box 1022, Troy, VA 22974-1022; James Palmer, (804) 589-8174



WISCONSIN

ABC R/C Inc. & Raceway, 244 W. Main St., Waukesha, WI 53186; Dick Mathiesen, (414) 544-1245; www.abcobby.com; email: help@abcobby.com



Best's Hobbies, 2700 West College Ave., Appleton, WI 54914

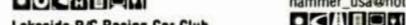


Dirt Heaven Hobby and Raceway, 6028 County Rd. K, New Franken, WI 54229; sales@dirtheaven.com; www.dirtheaven.com

Fast n' Fun, 250 Potreath Rd., Bellbrae West, Torquay, VIC 3228; Stephen Chara, 613 5266 1550 or 613 5266 1556; fax 613 5266 1556



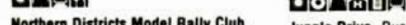
Illawarra RCECC, Croome Sporting Complex, Albion Park Rail, NSW 2527; Mel or Andrew, 042-714-683



Lakeside R/C Racing Car Club, Hollywood Dr., Lansvale, NSW 2166; R. Bartolozzi, 62-2-907-9800



Melton Electric Circuit Car Association, Safeway Car Park, corner High St. and Coburns Rd., Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805



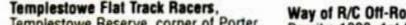
Northern Districts Model Rally Club, Inc., Rear Stanford Centre, 16 Stanford Way, Malaga, Western Australia 6066; G. Thirlwell, 61 (9) 249 3855, fax 61 (9) 249 4778; email tony@ois.com.au



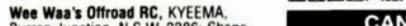
Penfield Park, DSTO Complex Salisbury, Adelaide, South Australia 5108; Trevor Unsworth, 618 8289-5010



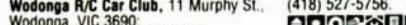
R.C. Speedway, 259 King St., Newcastle, NSW 2300; Andrew Dillon-Smith, 02-49265966



Templestowe Flat Track Racers, Templestowe Reserve, corner of Porter St. and Williams Rd., Templestowe, Melbourne, Victoria 31066; Renato Benci, 61 (3) 9553 4625



Wee Waa's Offroad RC, KYEEMA, Burren Junction, N.S.W. 2386; Shane, 61-02-6796-1339



Wodonga R/C Car Club, 11 Murphy St., Wodonga, VIC 3690; Ron Langman, 61-60-247-128



AUSTRIA

RMC-Wien, Aspernstrasse 5, Vienna, A-1220; Herbert Holze/Martin Hrzak, 43-664-4730376



BELGIUM

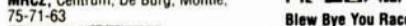
ATR-Alka-Tele-Racing, 3570 Stationstraat 21, Alken Limburg; 0032-11-25-49-03



Cartroubles Indoor Buggy Track, Jan Moonstraat 52-56, 2160 Wommelgem; Guy Ermes, 32-3-326-51-15, fax 32-3-326-51-01



MBV-Kampenhout, Teniersin 28, Kampenhout B1910, Frank Mostrey, phone/fax 0-16-65-75-18



MRC2, Centrum, De Burg; Montie, 75-71-63



Model Racing Club Oudenaarde, Scheldekaat, 9700 Oudenaarde; A. Chantier, 32-55-31-36-48, fax 32-55-30-19-12



R.C.R., Peilstraat 43, Rete 2470; A. Eelen, phone/fax 32-14-379685

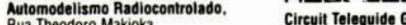


BRAZIL

Amoc Cassociaçao de Modelismo B. Camboriu, Junto ao Parque Ecologico de Bal. Camboriu, Bal. Camboriu, S.C. 88.330-000; Leo Cesar, (047) 366-0001



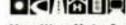
Brasilia R/C Motor Circuit, Estacionamento do Estadio Mane Garrincha, Brasilia, DF 70000; Alexandre (Alex), 55-061-273-7205



C.A.R. Curitiba Associaçao de Automodelismo Radiocontrolado, Rua Theodoro Makioka, 2300 Santa Candida, Curitiba, PR 82650-530; Ronaldo Assumpcao, 55-41-354-2804



Electric Car Club R/C Santos, Av. Bernardino de Campos, 227, Santos, SP 11065-001; Estevam or Arnaldo, 55-013-232-2536



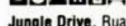
Hamilton Neto Associaçao RC, Rua Uterere 259, Curitiba, Paraná 80380-400; Danico Pilhax, 55-41-338-8041; hammer_usa@hotmail.com



Hobby Center, SOS.210 BI.H Apt. 204, Brasilia, DF 70.273; 061-242-0488



Hobby Planet Racing Club, Rod Dom Pedro 1, KM 1315, Campinas, São Paulo 13091901; Daniel, Helio, Luciano, 019 258 2768



Jungle Drive, Rua Alberto Maranhao, No. 219 Icha do Goo, Rio de Janeiro, 21940-490; Paulo Brito, (021) 396-0851 or (021) 393-7449



MP Raceway, Av. Nacoes Unidas, 6815 Lapa, São Paulo; Gerd Heitrotter, 55-11-980939; www.hpraceway.com.br



Off Roaders, Av. Guillermo Dummont Villars, 317, São Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931



Way of R/C Off-Road Cerrado, Rua Paraiso 1233, 1st floor, Belo Horizonte, Minas Gerais; Claudio T. Corrêa, (031) 227-6111, fax (031) 227-6869



CANADA

Action Weelz, 462 Turcotte, Vanier, Quebec, G1M 1R6; Regent Tardif, (418) 527-5756



Advance R/C Raceway, 4181 Sheppard Ave. E., Scarborough, Ontario M1S 1T3; Robert Lau, (446) 321-8377



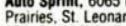
A&J Toronto R/C Raceway, 24 Main St., Bldg. B, Unionville, Ontario L3R 2E4; (905) 305-1479



The All New R.C. World, 2633 Hwy #6, Mt. Hope, Hamilton, Ontario L0R 1W0; Dave, (905) 765-2301, Larry, (905) 333-3297 or Brian, (519) 752-0044



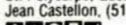
ATN' Bryan's Radical Raceway & Little Shop of Hobbies, RR 1, Ste. 12, Comp. 49, Chase, British Columbia V0E 1M0; Bryan Coffey/Dani Potvin, (604) 955-0669



Gilles Comtois, 1458 Boul. Lalleche, Baie-Comeau, Quebec G5C 1E1; (418) 295-1830



Hooby 2000, 75 St.-Jean-Baptiste, Ste. 140, Chateauguay, Quebec J6J 3H6; Hugues-Andre Meloche, (450) 698-2000



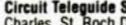
Honda House Motor Speedway, 384 Richmond St., Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530



Interior R/C Raceway, 34-1605 Summit Dr., Kamloops, BC, V2E 2A5; Martin Vanneuwenhuizen, (604) 374-1268 or (604) 374-8458



J-1 International Raceway, 127 Milligan Ln., Napanee, Ontario K7R 8A1; N. O'Neill, (613) 354-0099



Leading Edge R/C Speedway, 731 Gardiners Rd., Kingston, Ontario K7M 3V5; Mike and Tony Daicar, (613) 389-4878



Mid-Canada R/C Speedway, 216 Hutchings, Winnipeg, Manitoba R3H 0L3; Richard Driedger, (204) 339-6566



Circuit Pepsi, Centre de Location, 37 duRoi, Sorel, Quebec; (514) 746-8828



Circuit Plessis, 260 Rang 9 Ouest, Plessisville, Quebec G6L-2Y2; (819) 362-3743

Circuit R/C Pro, 1500 Chemin Sullivan, Val d'Or, Quebec; J9P 1M1; R/C Modeler Plus, (819) 874-3918

Circuit Teleguide St. Roch, 363-B St. Charles, St. Roch De L'Archigan, Quebec J0K 3H0; (514) 588-4254, fax (514) 588-6554

Circuit Teleguide Grand Prix II, 701, Sainte-Rose, Ste. 200, L'aprairie, Quebec, J5R 1Z2; (450) 444-1286

Quintrix Speedway, 610 Dundas St. East, Belleville, Ontario K7K 2M1; (613) 962-1414; fax (613) 962-7306

Club Auto Teleguides, 1750 Mlee Interprovincie, C.P. 35, Pointe-Fortune, Quebec, J0P10; Jacques St. Alevin, (514) 451-0078



Club Avatt, 244 Jules-Richard, Deauville, Quebec J1N 3; Daniel Vanier, (819) 864-6262



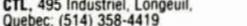
Club RCSI, 44 Rue Holliday, Sept-Iles, Quebec G4R; Sylvio Gerard, (418) 968-6575; Hobby Shop, (418) 962-6565



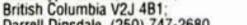
CRCCC, Box 309, Clinton, Ontario N0M 1L0; Eric Russell, (519) 482-9429



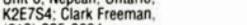
CTG, 450 Chemin de la Grand Ligne, Granby, Quebec; (514) 358-4419



CTL, 495 Industriel, Longueuil, Quebec; (514) 358-4419



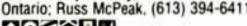
Dustkickers R/C Raceway, 1785 Cypress Rd., Quesnel, British Columbia V2J 4B1; Darrell Dinsdale, (250) 747-2680



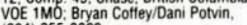
Dynamic Hobbies, 21 Concourse Gate, 110 Nepean, Ontario, K2E7S4; Clark Freeman, (613) 225-9634



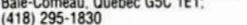
East Coast Model Center Raceway, 13 Glen Stewart Dr., Ste. 1. Southport, Prince Edward Island C1A 8X9; Gary Stephen, (902) 569-3262



Fast-Trax Speedway, RR 4, Trenton, Ontario; Russ McPeak, (613) 394-6411



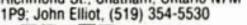
Fly'N Bryan's Radical Raceway & Little Shop of Hobbies, RR 1, Ste. 12, Comp. 49, Chase, British Columbia V0E 1M0; Bryan Coffey/Dani Potvin, (604) 955-0669



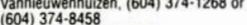
Gilles Comtois, 1458 Boul. Lalleche, Baie-Comeau, Quebec G5C 1E1; (418) 295-1830



Hooby 2000, 75 St.-Jean-Baptiste, Ste. 140, Chateauguay, Quebec J6J 3H6; Hugues-Andre Meloche, (450) 698-2000



Honda House Motor Speedway, 384 Richmond St., Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530



Interior R/C Raceway, 34-1605 Summit Dr., Kamloops, BC, V2E 2A5; Martin Vanneuwenhuizen, (604) 374-1268 or (604) 374-8458



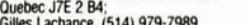
J-1 International Raceway, 127 Milligan Ln., Napanee, Ontario K7R 8A1; N. O'Neill, (613) 354-0099



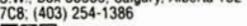
Leading Edge R/C Speedway, 731 Gardiners Rd., Kingston, Ontario K7M 3V5; Mike and Tony Daicar, (613) 389-4878



Mid-Canada R/C Speedway, 216 Hutchings, Winnipeg, Manitoba R3H 0L3; Richard Driedger, (204) 339-6566



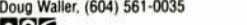
Minnature & Passions, 204 St. Charles, #103, Ste. Therese, Quebec J7E 2 B4; Giles Lachance, (514) 979-7989



MORRAC Raceway, 6449 Crowchild Tr. S.W., Box 36060, Calgary, Alberta T3E 7C8; (403) 254-1386



Off-Road R/C Raceway, 76 Eddystone Ave., North York, Ontario M3N-1H4; Ron Lefebvre, (416) 740-0536

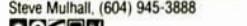


Prince George Radio Controlled Club, 202 Explorer Cres., Prince George, B.C. V2M5R8; Doug Waller, (604) 561-0035

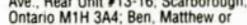


Quintrix Speedway, 610 Dundas St. East, Belleville, Ontario K7K 2M1; (613) 962-1414; fax (613) 962-7306

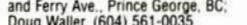
Randy Shantz Raceway, 1015 W. 14th St., North Vancouver, British Columbia; Pepe Muhal, (604) 945-3888



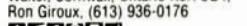
R/C Champ Raceway, 670 Progress Ave., Rear Unit #13-16, Scarborough, Ontario M1A 3A4; Ben, Matthew or Louie, (416) 289-8717



Recreation R/C Raceway, Hwy. 16 and Ferry Ave., Prince George, BC; Doug Waller, (604) 561-0035



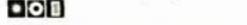
Ronbo's R/C Racing, R.R. 1, Glen Walter, Cornwall, Ontario K6H 3G4; Ron Giroux, (613) 936-0176



Roussillon Hobby Track, 177-D St. Jean Baptiste, Chateauguay, Quebec J6K 3B4; Darrin Charbonneau, (519) 692-5211



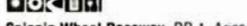
Shadetree Raceway, R.R. #4, 22566 Stage Rd., Thamesville, Ontario; Darrin Charbonneau, (519) 692-5211



Snye Wreck RC, R.R. #1, St. Regis, Quebec J0A 1HO; Aimee Mitchell, (613) 575-2496



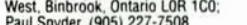
South Muskoka R.C. Track & Mini Putt, 8903 Hwy. 11, Orillia, Ontario L3V 6H3; Justin Fortin, (705) 329-0397



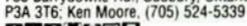
Spinnin Wheel Raceway, RR 1, Ariss, Ontario N0B 1B0; (519) 824-1614



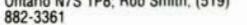
Steeltown Speedway, 3580 Kirk Rd. West,宾布里, Ontario L0R 1C0; Paul Snyder, (905) 227-7508



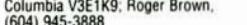
Sudbury Organized Auto Racing, 765 Barrydowne Rd., Sudbury, Ontario P3A 3T6; Ken Moore, (705) 524-5339



Thunder Alley Raceway, Lambton Mall, 1380 London Rd., Sarnia, Ontario N7T 1P8; Rob Smith, (519) 802-3361



Vancouver R/C Road Racers, #100-2733 Barne Hwy., Coquitlam, British Columbia V3E 1K9; Roger Brown, (604) 945-3888



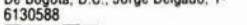
Club De Automodelismo Colombiano, Centro Recreativo Cafam, Kilometro 14 Autopista Norte, Santa Fe Bogota, D.C.; Jorge Delgado, 1-6130588



Club De Automodelismo Colombiano, Centro Comercial Guaymaral, Kilometro 16 Autopista Norte, Santa Fe Bogota, D.C.; Jorge Delgado, 1-6130588



Garoso Raceway, Avenida Liberdade con Diagonal Gran Colombia, Cucuta; Gabriel Rodriguez, 975-751892



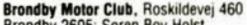
COLOMBIA

Club De Automodelismo Colombiano, Centro Recreativo Cafam, Kilometro 14 Autopista Norte, Santa Fe Bogota, D.C.; Jorge Delgado, 1-6130588



CYPRUS

Racing Model Club, Kennedy Ave. N. 42, Nicosia; Andrea Sotiriou, 493186; fax 493229



DENMARK

Brondby Motor Club, Roskildevej, 460 Brondby 2605, Soren Boy Holst, 45-36-4

HONDURAS

Autodromo Accion, Quinta Santa Maria, San Pedro Sula, Colonia Rivera Hernandez, Eduardo Hondal, (504) 52-2061



HONG KONG

ACO Racing Track, Mt. SS Cheng, M.W., Ping che, Fanling, (852) 2370-0723



Kingsville Buggy Arena, Wong Chuk Yeung Village, Shatin, N.T., Pak Yeung, (852) 607-0828



INDONESIA

1st Circuit, Kompleks Villa, Kalijudah Indah, Surabaya; 62-31-5681965



Cipaku Indah Speedway, Jl. Cipaku Indah II/2, Bandung 40143; Cipaku Indah Hotel, Erwin Lewi, 62-22-218-228, fax 62-22-210-223



Karinda Off-Road R/C Car Model Circuit, Perumahan Bumi Karang Indah, Jl. Karang tengah Rayam lebak bulus, Jakarta Selatan 12440; Wiwid W. Soedarmadi, 62-21-7900878



Pondok Cabecircut, JL. Kunir No. 83, Pondok Cabe, Ciputat, Jakarta, Ali Agus Salim, 7403568-9, fax 7491533



Uno 158 Off Road Track, Wicaksono Suryatanto, Nginden Sembolo War 42, Surabaya; 62-31-5675133; email: wsurya@bsy.centrin.net.id



Sentul World Hobbies, Ciremeup Bogor Java Barat; International Circuit Hilton Hartanto, Ian Sentul International Sirkuit, KM 42 62-21-751-2439



ISRAEL

Ircca Off-Road, Rahana; Yaron Zafiris, (972) 030549937



Nahshoneat, Abba Niel Silver Str. 64, Haifa 32809; Golan Levy, (972) 039386444 or (972) 04231252



ITALY

Associazione Modelisti Cossato, via P. Maffei, Cossato 13014, Biella; Zanellato Romido, 015-405881; fax 015-922709

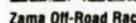


JAPAN

Xiwakuni R/C Track, PSC 561, Box 978, FPO AP 96310-0978; David T. Eck, 81-6117-53-3662



Yokota R/C Racers, PSC #78, Box 3889, APD AP 96326, Tokyo; Donnie Leornas, 011-813-11-757-2012 or 001-813-11-755-2272



Zama Off-Road Raceway, 17th ASGM Unit 45013, Box 3232, APD AP 96338; SFC Ken Campbell, 81-3117-63-8478



KUWAIT

Inferno DX 4WD Track, P.O. Box 9167, Ahadi 61002; Yousef Acqatari



LEBANON

Wild Willy RCC, Oscar St-Jal Eddie, Beirut; 00961-4-403751



MALAYSIA

Titiwangsa Raceway, Lot 128, Ampang Park, Shopping Centre, Jalan, Ampang, Kuala Lumpur 50450; R.A.C.E. Sdn Bhd, 03-2614496



Jump Square Arena, A121.SG, Buloh N/V, 47000, SG, Buloh, Selanor; Thomson Chong, (603) 656-2513



MEXICO

Aices Off Road, Lopez Mateos y Rayod S/N, Ensenada, Baja California, BC 22830, Jorge Bustamante, 667-6-1476, 61477, 86729

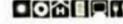


Baja Jr., H. Valdez 151 Pte. Y Gmo. Prieto, Los Mochis Sinaloa 81200; Memo Ascenso, Gaby Macias, 681-20276; fax 681-26430



Club Kyosho de Automodelismo Delartino, Av. Pacifico 216

Coyoacan, Ayusco-Toluca Km. 15.3 DF 04330, Ing. Jorge Perez Holder, 525-544-08096; fax 525-544-7133



Cinamo Coca-Cola,

Ruiz Cortines 620 Col. Central de Carga, Guadalupe, Nuevo Leon 67120, Sergio Garza, 83-35-70-0979-32-33



Hobby Centro, 12 de Diciembre No. 3070-A, Guadalajara, JAL 45550; Alejandro Ortiz Del Toro, 36-21-46-28



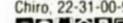
Hobby's Formula, Av observatorio 457 DF 01120; 905-502-3620



Hobby Model's Raceway, Blvd. Garcia de Leon, 1555, Morelos, Michoacan 58620, 431-5-01-22



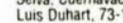
Jaguar R/C Club, Calz. Zavala 116, Puebla 72150; Chema, Denise or Chiro, 22-31-00-91, 22-33-00-94



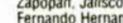
La Hielera, Prol Corregidora Nte 350, Queretaro, ORO C.P. 76160, Jorge Morelos Rabell, 42-12-15-25



Pista Casino, Hotel Casino de la Selva, Cuernavaca, Morelos 16507; Luis Duhart, 73-19-12-38



R/C Racing Club, Obsidiana #2900, Zapopan, Jalisco 44560; Fernando Hernandez, 3-616-73-47



Tony's Track,

Obregon 316 Sur, Culican Sinaloa; Guillermo Prieto, 67-165708-168141

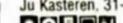


NETHERLANDS

H.F.C.C. Hollandia, De Werf 60, The Hague; G. de Jong, 031-070-3679820



M.A.C. Vlymen, Hendriklaan 6, Vlymen; Ju Kasten, 31-73-517906



NEW ZEALAND

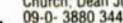
Capital Model Racers, Avalon, Lower Hutt; Roger Whitmarsh, 04-566-5714



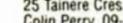
Counties R/C Raceway, Pukekohe Showgrounds, Station Rd., Pukekohe; R. Northcott, 09-23-86904



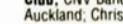
Harewood Radio Control Car Club, 550 Sawyers Arms Rd., Christ Church; Dean Johnson, 09-0-3880 344



Papakura Indoor R/C Car Club, 25 Tainere Cres., Papakura, Auckland; Colin Perry, 09-298-4711

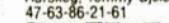


Western District R/C Off-Road Car Club, CNV Bancroft/Akatea Prive, Auckland; Chris, 09-838-5201

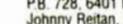


NORWAY

Aurskog R/C Club, Aursmoen, 1930 Aurskog; Tommy Gjeleseth, 47-63-86-21-61



Dalen Raceway, P.B. 728, 6401 Molde; Johnny Reitan, 94 64 52 95



Hadeland Raceway

2750 Gran, Gran; Dag Bakke-Nilssen, 61330405



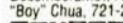
Store-Baller Raceway,

2750 Gran, Gran; Ola Raastad, 61330225

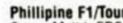


PHILIPPINES

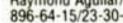
Boyle R/C Hobby Shop, Unit No. 10 Lucas Commercial Center, Marcos Hwy., December, Antipolo, Rizal; Jose "Boy" Chua, 721-2555



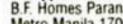
Philippines F1/Touring Club, Super Mall I, EDSA, Quezon City 1156; Raymond Aguilar/Ron Villafior, 896-64-15-23-30-08



Philippines R/C Association, B.F. Homes Paranaque, Metro Manila 1700; Ronald/Manny Villafior, 23-30-08



Hobby Centro, 12 de Diciembre No. 3070-A, Guadalajara, JAL 45550; Alejandro Ortiz Del Toro, 36-21-46-28



Hobby's Formula, Av observatorio 457 DF 01120; 905-502-3620



PORTUGAL

Aero Clube da Madeira, Rua do Castanheiro E-2, Funchal, Madeira; fax 911-22165



B.R.C.A. Boksborg Radio Car Association, c/o Wannenborg & Dayan Rd., Dayan Glen, Boksburg, Gauteng; Anton, 083-442-4567; www.recycle.co.za



Frantic Raceway, Santam Plaza, Shop 16B, Welkom; Wayne Roodt, phone/fax 27-57-35-72849



Gordons Bay R/C Club (GBRC), Andrew Norman Sports Centre, Gordons Bay, Cape Province; Andre Hollander, 024-512865



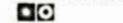
Helderberg Radio Control Car Club, De Beers Soccer Club, De Beers Ave., Somerset West, Cape Province; Andre Hollander, 024-51-2865



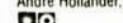
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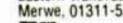
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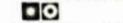
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Chris's BACK LOT

The true test of an RC racer

Do you call yourself a racer? If you hit the local club race every Sunday, you're definitely a competitor, but a racer is something else. All racers are competitors, but by my definition, not all competitors are racers. How do you stack up? Take this easy quiz to find out. Award 10 points for each "A" answer, 20 points for "B" answers and 30 points for "C" answers.

1. The night before a race, you:

- A. rebuild your diff.
- B. organize your tools and supplies.
- C. call your friends to see whose trunk you left your stuff in.

2. To get to the race track, you will:

- A. drive a truck, van, or SUV that can easily haul all your stuff.
- B. drive a tricked-out import or pony car that reflects your love of motorsports.
- C. bum a ride with one of your friends who chose "A" or "B."

3. The amount of time you spend practicing is usually:

- A. at least 1 hour.
- B. at least 1/2 hour.
- C. during the first two qualifiers.

4. Your pit box is filled mostly with:

- A. tools.
- B. tools and spare parts.
- C. lunch.

5. At the track, you wear:

- A. a shop apron, so your clothes won't get dirty.
- B. a tool belt, for quick trackside repairs.
- C. whatever you wore to the party last night.

6. After a trophy race, you:

- A. place the trophy on the mantel in the living room.
- B. place the trophy on a shelf in the workshop.
- C. peel off the brass nameplate, stick on a piece of masking tape with "World's Greatest Dad" written on it and present it to the old man for Father's Day.

7. Following your heat, you:

- A. return your transponder, then get ready to corner marshal.
- B. remove and dump your pack, return your transponder, then get ready to corner marshal.
- C. grab a stall in the men's room until the next heat is over, then forget to return your transponder.



8. If you sell an RC car, it's probably to:

- A. buy a car to race indoors since the outdoor season is ending (or vice versa).
- B. buy the latest, greatest car for your racing class.
- C. pay off a speeding ticket.

9. At a travel race, you usually rent a car that:

- A. is inexpensive, so you have money for other stuff.
- B. is large, to carry all your gear.
- C. appears able to catch a lot of air.

10. When choosing a hotel for a travel race, the number one thing you look for is:

- A. close proximity to the track.
- B. a large room so you can spread out and work on your cars.
- C. Spectravision.

SCORING

100-170 points: you're a nice, decent guy who loves RC. Everbody enjoys hanging with you at the track. Unfortunately, you're not a racer.

180-260 points: you've got a racin' streak, but you're still a little too straight to be a full-on racer. That's a compliment.

270-300 points: congratulations, you're a genuine racer and, believe me, it takes one to know one! You've gone beyond the RC-as-hobby level and made it to RC-as-lifestyle. Wait till my new book comes out, "Zen and the Art of RC'ing while eating Fritos."



HAWAIIAN HUMILIATION PART II

Hey, Chris; what's up? I bought a quad about a year ago, and this is what I've added; an MIP tuned pipe and boost bottle and 20-percent nitro. I just read your "Back Lot" about the Hawaiian quad race in the January 2000 issue; where can I get the Kyosho .15? And is it worth it? I also wonder whether you've had problems with the chain getting too loose even when you've tightened it, and have you had any problems with the rear shock? Any suggestions would be greatly appreciated! Thanx! [email]

Jarrod

Jarrod, did you read my article? The larger engine blew out the clutch, and I came in dead LAST! I went all out with illegal hop-ups, and what did it get me? I'll tell you what—NOTHING!—except a turn-marshaling position for the second half of the 45-minute endurance race I should have won with my tricked-out, faster-than-anybody-else's machine! My foolish cheating got me nothing; that was the whole point of that "Back Lot," Jarrod. On the other hand, if you're still bent on humiliating yourself: I got the Kyosho .15 out of a SuperTen kit that included the engine. CC



IT'S WHO YOU ARE NOT WHAT YOU DO

OK: I'm not gonna tell you how cool your "Back Lot" page is because I'm sure you already know it rocks! The thing on the frequency markers on radio antennas was hilarious! All my friends are either bikers or skaters. When people ask me what I am, I don't know what to say; I just tell them I race RC trucks. What should I call myself? An RC'er? Do you have any other suggestions what to say when people ask what I am?

I am also a big fan of your "Piston Power" articles, so keep them coming!

Brad

"What do I call myself?" you ask ... your name is Brad; right? So just tell them this: "My name is Brad!"

I think RC cars are RAD!

If you don't like it, it's too \$#@&% BAAAAD!"

This approach has always worked for me, Brad. Good luck! CC ■

Chris's Back Lot RC Car Action
100 East Ridge, Ridgefield, CT 06877-4606 USA
Email: chris@airage.com